

DECIDING WHAT NEEDS TO BE DONE AGAIN: COMPANY GRADE
OFFICER INSTRUCTION FOR ARMY AFTER NEXT

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General Studies

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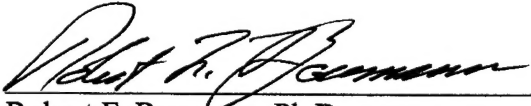
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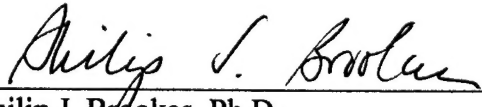
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ABSTRACT

DECIDING WHAT NEEDS TO BE DONE AGAIN: COMPANY GRADE OFFICER INSTRUCTION FOR ARMY AFTER NEXT by MAJ P. Kevin Dixon, USA, 93 pages.

This study investigates whether the methods of instruction in the Captains Career Course have evolved to account for technological advancements to train the cognitive domain. The Army is investing considerable resources in the development of information systems to assist the soldier in visualizing his battlespace. This study looks at the impact of these innovations on the cognitive demands of company command and the resulting requirements on the institutional training base. This study traces the historical background of institutional instruction of captains, then analyzes the current Armor course against both the theory and training regulation requirements. This analysis leads to the synthesis of a framework for a future model. A brief interlude incorporates the framework into a model set in the year 2005. The study concludes with recommendations to Training and Doctrine Command on how to incorporate technological advancements in cognitive instruction.

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CHAPTER 1

INTRODUCTION

Our training methods are conditioned by the ideal of automatic response. At the same time, our observation of the battlefield's reality makes clear to us that we need men who can think through their situation and steel themselves for action according to the situation. (Marshall 1947, 40)

Brigadier General S. L. A. Marshall, *Men Against Fire*

The Problem

Brigadier General Marshall's *Men Against Fire*, written in 1947, described the challenge of training soldiers to deal with the chaotic environment of combat. While his indictment of the methods used to train soldiers may seem harsh for an Army that had just won World War II, his passion for the requirement to train soldiers to adapt to the ever-changing nature of warfare is justified. The conflict he identified between educating or training the US Army may be timeless.

The environment of combat is harsh (FM 100-5 1993, 14-1). This environment includes both a physical and psychological dimension. The psychological perspective of the environment of combat is described in the Army's capstone doctrinal manual FM 100-5, *Operations*, as "the harsh environment of combat is likely to have a greater effect on the soldier's mind than on his body. Since the mind directly affects the soldier's will to win, it must be prepared to accept the stress of combat today" (1993, 14-2).

To address this environment,

from WWI until 1975, the Army followed the Army Training Program which carried a division from individual training through squad, platoon, company, battalion, regiment or brigade, to division, in each arm of service on the basis of so many hours for this and so many hours for that. Men and units proceeded

through the program whether they learned or not. Frankly, nobody knew. There were few tests and what there were, were subjective. If you could survive the schedule you were presumed to be trained. (Brownlee and Mullen III 1987, 202)

This is the situation that faced the Army's senior leadership as it began the first revolution in training. By the end of that revolution, the Army was embracing, "a new concept of performance oriented training, which is a systematic way to go about the setting of training objectives through careful determination of tasks, conditions, and standards" (Brownlee 1987, 184). Instructional methods today are the result of that first revolution in training.

Observations of training today include the 1997 RAND Corporation study, *Company Performance at the National Training Center*, which revealed a "strong positive correlation between commander's planning skill and execution success," (Hallmark and Crowley 1997, 56) as well as an observation on leader training. "By leader training, we specifically refer to developing a company commanders' cognitive ability to visualize his battle and control the company's direct fires" (Hallmark and Crowley 1997, 56).

Visualization of the interaction of terrain, enemy and friendly forces over time is the requirement that Hallmark and Crowley point out. Unfortunately the study found, "fewer than half of the commanders observed were consistently adequate or better at any of the complex planning activities and even fewer adequately planned specific direct fire control measures" (Hallmark and Crowley 1997, 56).

The Army is investing considerable resources in the development of information systems to assist the soldier in visualizing his battlespace to fulfill that requirement in all three areas simultaneously. These systems are designed to help the soldier by reducing

the fog of war and create an environment that allows greater mobility, lethality and survivability. But what impact will those systems have on the cognitive requirements of the soldier on the future battlefield, and how will we train soldiers to harness the incredible capability that those systems promise?

The cognitive ability to visualize the battlefield is one recognized deficiency in the past and current training of the company commander. What advances made in cognitive theory and instruction methods might help the Army correct this deficiency? Gary Klein, a cognitive psychologist observed, "Systems approaches to training were an improvement over anarchy. Nonetheless, they were not designed to teach people to gain higher levels of expertise or to make better judgments and decisions" (1999, 169). Higher levels of learning refer to the taxonomy of educational objectives outlined by Benjamin S. Bloom in 1956. This taxonomy classifies the goals of education from the lowest level to the highest as "knowledge, comprehension, application, analysis, synthesis, and evaluation" (Bloom 1984, 18). The observation by Hallmark and Crowley begs the question: at what level should the institutional training base train the company commander?

Additionally, contrary to some popular perception, recent studies suggest general friction will not be removed from future conflict due to gains in information technology and its proliferation on the battlefield. Barry Watts, in *Clauswitzian Friction and Future War*, argues that, "the greater the stress, the more data will be ignored, noise mistaken for information, and information misconstrued, and the greater will be the prospects for confusion, disorientation, and surprise" (1996, 126). If one agrees with that basic premise, then it is incumbent on the Army, more specifically the Training and Doctrine

Command to come to grips with a holistic strategy that will train leaders to execute the revolution in military affairs the Army may be witnessing today.

The Army is not the only institution grappling with the impact of information systems. Andrew S. Grove, in *Only the Paranoid Survive*, describes their impact on business as a strategic inflection point, “where the old strategic picture dissolves and gives way to the new, allowing the business to ascend to new heights” (1996, 32-33).

Information systems have so altered the conditions in which future leaders must operate in that the Army is faced with a strategic inflection point. Therefore, if the Army wants to achieve the new heights that this opportunity promises, it must carefully select the way it trains or be rendered incapable of dealing with the information it is working so diligently to amass.

The platoon is at the end of the information pipeline where information fidelity and timeliness are at a premium. Therefore the company team level is probably the first layer of command at which the commander has the time and the requisite experiences to look at emerging battlefield patterns and make rational decisions based on multiple information inputs. It is at this level that the higher commander’s vision of “what and why” are turned into the very real effects of “how.” The ability to determine the best tactics, techniques, and procedures to transform the concept of the operation into a viable scheme of maneuver is the result of experiential learning over years. Where does this company commander receive the baseline knowledge to develop this experience?

The mission of the Captains Career Course as outlined by the Training and Doctrine Command Regulation 351-10, is to instruct officers so that they, “acquire the

leader, tactical, and technical skills to lead company sized units and serve at battalion and/or brigade staff levels” (TR 351-10 1997, 3-5).

Assumptions

This study assumes that digital information systems capable of showing a near real time picture of the terrain, enemy, and friendly forces will be present in maneuver battalions in sufficient numbers that every leader down to platoon level will have one. It is also necessary to assume that the phase I portion of the Captain’s Career Course will remain the branch proponent’s responsibility and phase II (Combined Arms Service Staff School) will remain the responsibility of the Combined Arms Center at Fort Leavenworth.

The Research Question

This study is an attempt to determine whether the methods of instruction in the Captains Career Course have evolved to account for the technological advancements to train the cognitive domain, that is, the use of the microprocessor to provide repetitive exercise in tailored situations with feedback. The paper will first examine the theory of cognitive instruction. The paper will then analyze selected periods of officer instruction to determine whether the Army has favored one form of instruction over another. If a trend is identified, the paper will answer why that form of instruction was selected. Finally, the paper will analyze the results and see whether instruction has kept up with the pace of change. If instructional techniques have not, the paper will offer a model and justify those modifications.

Research Methodology

This thesis is organized into five major parts. The first examines the cognitive domain and how instruction can be used to improve problem solving. Theory is useful in not only outlining a body of accepted principles but also provides an ability to analyze and explain behaviors. This will allow understanding and then a comparison of the approaches used in providing complex cognitive instruction.

The second major division of the paper will examine the history of institutional training in our Army. History reveals lessons learned from previous experience and also provides a framework for comparison to help understanding of the approaches used. Selected periods of the history of institutional training from the founding of the Army to today will be analyzed using the same basic criteria. These include identifying the form of instruction, the reasons for selecting that form, and the relationship of the form to the organizational structure of the Army of that time.

The analysis will define and then determine whether present Army institutional instruction techniques have kept up with the pace of change and determine if the system meets instructional requirements.

The fourth section is the centerpiece of the thesis. This section will offer a model instructional system that accounts for changes in instructing the cognitive skills required of a leader at the company grade level on the battlefield of today and the future.

The final chapter will attempt to draw some conclusions from both the historical survey of American institutional instruction and discuss implications of the model.

Key Definitions

Adaptive. Something that is changed or changes so as to becomes suitable to a new or special use or situation.

Cognitive. Objectives which deal with recall or recognition of knowledge and development of intellectual abilities and skills.

Cognitive Mental Stressors. Mental stressors that cause the individual to think. Examples include too much or too little information, sensory overload versus deprivation, ambiguity, uncertainty, isolation; time pressure versus waiting; unpredictability; rules of engagement (ROE), difficult judgments; organizational dynamics; hard choices versus no choices; recognition of impaired functioning.

Dominating Maneuver. The multidimensional application of information, engagement, and mobility capabilities to position and employ widely dispersed joint air, land, sea, and space forces to accomplish the assigned operational tasks.

Education. The knowledge or skill obtained or developed by a learning process.

Training. To make proficient with specialized instruction and practice.

Simulation. Military training that replicates the interactions of weapons systems and frictions of men in battle.

Limitations

The impact and development of information systems in warfare is one current subject of our Army's intellectual energy. This study limits its look not at the impact or development of computing devices in the hands of a warrior but at the institutional training requirement at the Captain Career Course level to enable the officer to harness the

power of the information that those devices provide. Additionally this study is limited to Phase I of the Captain Career Course (Branch Specific Training).

Significance of this Study

The strategic inflection point the Army is witnessing today demands examination of the potential for a second training revolution. The study will, at its endstate, help to determine whether the Army needs a new model to implement the advances in cognitive training methods in the institutional training base at the Captain Career Course level. In order to have a better understanding of cognitive training requirements; it will be useful to first look at the theory of cognitive instruction to serve as a basis for future analysis.

CHAPTER 2

INSTRUCTION IN THE COGNITIVE DOMAIN

The primary purpose of any theory is to clarify concepts and ideas that have become, as it were, confused and entangled. (Clausewitz 1989, 132)

Clausewitz, *On War*

In order to analyze and explain the principles of institutional instructional design it is necessary to outline the theory of instruction in the cognitive domain. Theory is systematically organized knowledge applicable in a relatively wide variety of circumstances. It uses accepted principles and rules of procedure to analyze, predict, or otherwise explain the nature of behavior of a specified set of phenomena (*The American Heritage Dictionary*, 2nd ed., s.v.).

Leaders solve problems on the battlefield. Each time a leader solves a tactical problem he learns from the experience and his capacity to deal with similar problems is forever changed. The cognitive domain deals with the development of the internal abilities and skills to solve problems. "A cognitive strategy is an internally organized skill that selects and guides the internal process involved in defining and solving novel problems. In other words, it is a skill by means of which the learner manages his own thinking behavior" (Gagne and Briggs 1979, 72). Bottom line: the cognitive domain teaches people "how to think."

Instructing people how to think takes on many approaches. Two forms have dominated the Army's methods of instruction in this domain. These forms provide the ends of the spectrum of possible combinations used to provide complex cognitive

instruction. While neither exists in pure form in our institutional system, they do provide a useable framework for understanding and further analysis.

At one end of the spectrum is training. Training attempts to make the learner proficient with specialized instruction and practice (*The American Heritage Dictionary*, 2nd ed., s.v.). Training focuses the learner on “what” or “how.” Frequently what or how is associated with a specific task to be accomplished. Clear, disassemble, assemble, and perform a function test on the M240 machine gun is an example of training. Training is usually performed within specific conditions and measured against a prescribed standard.

On the other end of the spectrum is education. Education is a learning process that imparts knowledge or skill. Education focuses on “why” or “whether” a task should be done. Determine the possible employment of the M240 machine gun in the following situation is an example of education. The focus is on “if” and “why” the machine gun is employed, not the components of doing so. There are multiple ways to employ the machine gun once it has been determined that it is required. “The use of cognitive strategies by a learner is indicated by his or her solution of one or more novel problems with answers of greater or lesser quality. In such problems, however, there are many right answers, not just one. . . . What must be recognized, nevertheless, is that novel problem solution depends upon previously learned information and intellectual skills” (Gagne and Briggs 1979, 202). Military art, like the cognitive domain, allows for more than one correct solution to a problem. In his prize-winning essay “Proper Military Instruction” written for the *Journal of the Military Service Institution of the United States* in 1897, Captain James S. Pettit wrote, “We must remember that military science is not

an exact science and that the same results may be obtained by different methods” (1897, 44).

In the same essay Captain Pettit divided instruction into two kinds:

1. That which has for its object mental training or discipline.
2. That devoted to the imparting of knowledge. The knowledge may be utilitarian, or it may be regarded in the light of accomplishment (1897, 13).

Captain Pettit continues with, “Kant’s position seems unassailable, to encourage independence of thought, and to direct study to the strengthening of the powers of the mind are certainly the fundamental ideas in modern education” (1897, 13). Despite the lack of a label, Pettit classifies instruction into education (item one) and training (item two).

Regardless of the form used, repetitive experience is a significant component in instruction. Humans learn from experience, exposing a person to a situation and then doing it again affords the learner an opportunity to alter behavior and try something new. “Planning for a sequence of instruction designed to improve the quality of problem solving usually takes the form of *repeated opportunities* for problem solving” (Gagne and Briggs 1979, 202). Exposing the student to a situation or problem two or three times does not guarantee progress by itself. “It does not seem likely that observable amounts of improvement in this type of capability [cognitive] can occur within the space of a single lesson or two” (Gagne and Briggs 1979, 202). Gagne and Briggs affirm this is true because, “the efficacy of an individual’s cognitive strategies exerts a crucial effect upon the quality of his thought. They may determine, for example, how creatively he thinks, how fluently he thinks, and how critically he thinks” (1979, 72).

Determining efficacy requires feedback. This feedback should be linked to the situation or problem by examination of “what” happened and more importantly “why” it happened. This linkage between cause and effect is a simple yet critical component in any cognitive learning process. Robert Gagne and Leslie Briggs simply described the conditions of the process with, “favorable conditions are those which provide opportunities for development and use of cognitive strategies. In order to learn how to think the student must be given opportunities to think” (1979, 73). The “favorable condition” is an opportunity for the student to first think, perform, and then receive tailored feedback based on the situation presented. Repetitive experience is necessary in any cognitive instructional model. However, in order to be viable the experience must include performance feedback based on established cause and effect.

Achieving this cause and effect relationship is difficult because, “cognitive strategies require a more indirect control; one has to organize external events so as to increase the probability of certain internal events” (Gagne and Briggs 1979, 72). Instruction can overcome this difficulty by carefully crafting the conditions of the problem or situation. Army training doctrine has addressed this requirement for some time. Situational training exercises (STX) lanes have carefully designed scenarios in order to exercise certain actions or tasks from the soldiers undergoing the instruction.

In dealing with any complex learning requirement instruction is frequently broken down into smaller parts in order to use a stepwise approach to learning the subject. Since novel problem solving is dependent on previously learned material, cognitive instruction readily lends itself to the stepwise approach. The student benefits from this method

because, "as novices learn tasks well enough and those tasks become more automated, they gain the freedom to look ahead" (Klein 1999, 159). The capability to look ahead comes from mastery of previously learned material. This mastery allows the student to focus on analysis of the situation or problem, not on the process of decision making. Moreover, command of previously learned material allows the student to turn separate actions into an integrated whole.

The ability to look ahead is not solely produced by mastery of previously learned material. The decision-making approach used by the individual also impacts this ability. While decision making and its many models is not the subject of this study, it must be addressed to fully understand how the Army trains leaders.

Since leaders solve problems on a complex battlefield they must make decisions. And, since any method of instruction in the cognitive domain addresses how individuals think, the two are inextricably linked. Recent advances in understanding decision making have brought the traditional analytical model, in which alternative courses of action are compared, into question. Because of time constraints on the company commander it is much more likely that he will use pattern recognition or recognition primed decision-making. This likelihood is important because acknowledgment of it shifts the focus of any institutional training model away from optimization of multiple courses of action to the satisfying of one. Recognizing battlefield patterns is a key component to military decision making. Therefore repetitive experience assists the training of the company commander by allowing multiple opportunities to observe battlefield patterns and then evaluate cause and effect.

Gary Klein, a noted cognitive psychologist, explains this relationship.

We do not make someone an expert through training in formal methods of analysis. Quite the contrary is true, in fact: we run the risk of slowing the development of skills. If the purpose is to train people in time pressured decision making, we might require that the trainee make rapid responses rather than ponder all the implications. If we can present many situations an hour, several hours a day, for days or weeks we should be able to improve the trainee's ability to detect familiar patterns. (1999, 30)

One way to increase repetitions is the use of simulations. Historically, wargames and map exercises provided a way for the institutional training base to provide practical application in the theories of war. As early as the 1880s, The School of Application for Infantry and Cavalry at Fort Leavenworth adopted such games. Leaders such as Pettit recognized the reason for inclusion of simulations or wargaming over one hundred years ago. "Knowledge acquired from text-books does not tarry with us long unless it has been fastened by some practical illustration" (Pettit 1897, 45). Today, large sums of money are put into development of all types of simulations.

There are three basic categories of simulations used in our Army today. The first, constructive simulation can trace its lineage back to the map exercises of the last century. Constructive simulation is useful in exercising the staff skills necessary to handle large bodies of troops that would otherwise be cost prohibitive. Psychologist Gary Klein comments on the value of such simulations, "A good simulation can sometimes provide more training value than direct experience. A good simulation lets you stop the action, back-up to see what went on, and cram many trials together so a person can develop a sense of typicality" (1999, 43).

Captain Pettit cautions his audience that “war games must not be taken too seriously. We must remember that the little markers are inanimate objects without emotions. They do not get tired, or footsore, or hungry; they take no account of weather or roads; they never disobey or misunderstand orders” (1897, 50-51). Captain Pettit’s observation is accurate in that constructive simulation removes many of the frictions of combat. Despite their removal, constructive simulation has a place in any instructional model if it is done in conjunction with the other types of simulation in a logical system.

The next form of simulation is virtual simulation. Virtual simulation attempts to immerse the student in a synthetic environment by replicating as much of the physical fidelity of the system as possible. Fully exercising the man machine interface, these systems increase learning by creating a realistic operating environment. Aviation systems, Abrams tanks, and Bradley fighting vehicles all have well known virtual simulations associated with them that significantly reduce the cost of training.

The last form of simulation is live simulation. Live simulation is exemplified by the National Training Center. Live simulation attempts to replicate all the frictions absent in Captain Pettit’s observation except the actual production of casualties and the resultant fear associated with them.

Regardless of the type of simulation used, the importance of decision making based on previously learned knowledge is paramount. In 1897 Captain Eben Swift described this necessity in his brilliant essay, “The Lyceum at Fort Agawam.” “You [the student] will be constantly called on to answer questions which will require a knowledge of the capabilities of the arms of service, an understanding of the military situation and a

ability to give brief and clear decisions” (1897, 260). Swift’s purpose of simulation or wargames embodies many of the elements of cognitive instruction; reliance on previously learned information is synthesized in the student’s decision based on the given situation.

Overall, simulations play an important role in both institutional and unit training. Technological advances continue to insert increasing amounts of friction into simulations in an attempt to better replicate the conditions of modern warfare. Simulations provide both repetitive experience and an ability to observe battlefield patterns in a controlled environment that can readily capture what and why it happened in order to focus feedback and learning.

Because simulations immerse the student in the environment of combat they assist in the development of a “sixth sense” or intuition. Intuition plays an important role in military art. Intuition is the trait some leaders credit with successful mission outcome. Can intuition be taught to leaders? Klein provides a definitive answer to this question when he states; “Many people think of intuition as an inborn trait--something we are born with. I am not aware of any evidence showing that some people are blessed with intuition, and others not. My claim in this chapter is that intuition grows out of experience” (1999, 33). His answer clearly links an ability to look ahead with experience. Connectivity is now established between repetitive experience and a stepwise approach to cognitive instruction. The value of the experience is increased with feedback that establishes both cause and effect allowing the learner to analyze and determine how he can do it better. The validity of this model is evident in its adoption in the US Army’s after-action review (AAR). What happened, why did it happen, and how can we do it better is

the format used in collective training exercises throughout the Army. The focus of the AAR is execution of tasks to achieve a purpose. Does institutional leader training need the same execution focus?

George S. Patton said, "Execution is to plan as 5 is to 1" (Nye 1993, 99). His emphasis on execution is understandable when placed in the context of his life and exploits. But Patton was much more than the hard-charging cavalryman turned tanker portrayed in movies and popular folklore. Patton was a very serious student of the art of war and he left behind volumes of notes and writings of his thoughts on military art. In his book *The Patton Mind*, Roger Nye explores the self-development program used by Patton throughout his lifetime. This examination reveals insightful analysis on Patton's study and thoughts. An avid reader of wide-ranging subjects, Patton determined that execution was central to victory. His study of *Infantry in Battle* led him to make the marginal note of "too true" next to the following passage:

A superficial reading of military textbooks is likely to convey the idea that the duties of a leader consist only of estimating the situation, reaching a decision, and issuing an order. It is evident, however, that unless the orders of the commander are executed, even a perfect plan will fail. On the other hand, a poor plan, if loyally and energetically carried out, will often succeed.

A commander then, must not only issue his order but must also see to its execution. It is the omission of this final step that has caused many brilliant plans to go awry. Too often a leader assumes that once a plan is completed and the order issued, his responsibility for action terminates. He seems to feel that he has discharged his obligation and the execution remains entirely with his subordinates. (Harding et al. 1939, 195)

This note of too true coupled with the 5 is to 1 comment captures the essence of company grade leadership. The present day troop leading procedures include; "supervise and refine" as the last step in an effort to address this much needed component.

Execution justifies the tasks of plan and prepare. Planning and preparation, while important, does not equate to mission accomplishment, the reason battlefield activities are performed.

In his excellent study entitled *Initiative-Oriented Training*, Major Lawrence Larsen focuses on the role of the leader during execution of an operation. "If units are to succeed against able and willing opponents then we must train leaders accordingly" (1998, 44). The leader's role during execution of an operation is his decision, and ability to put them into orders. Larsen offers four components to successful accomplishment of these leader tasks.

1. Can the leader assess the problems of his situation, anticipate requirements and develop a course of action consistent with higher intent.
2. Can the leader articulate his decisions, issue FRAGOs that relate terrain, enemy, and friendly forces that are consistent with real, not doctrinal capabilities.
3. Subordinates have the means / proficiency to carry out his orders.
4. Leader commands through his subordinates actions rather than his directives. (1998, 45)

The relationship between military decision and the cognitive domain has already been established. Further examination of Larsen's writing reveals additional connectivity to instructional theory. Situational assessment, requirement anticipation, and creative thinking (course of action development) are all linked to Gary Klein's assertion of mastery of previously learned material. Larsen's second point, the issuance of fragmentary orders (FRAGOs) considering the interaction of terrain, enemy, and friendly forces requires the leader to synthesize the information prior to issuing instructions to subordinates. Synthesis is a step on the ladder of Blooms' Taxonomy of Educational Objectives.

The taxonomy creates a framework to perform stepwise approaches to learning inside the cognitive domain. Bloom classified the levels of learning as shown in figure 1.

KNOWLEDGE – Recall of specifics and universals, recall of methods and processes, or a pattern, structure, or setting.

COMPREHENSION – Lowest level of understanding. Knows what is being communicated and can make use of the material without relating it to other material or seeing its fullest implications.

APPLICATION – The use of abstractions in particular and concrete situations.

ANALYSIS – The breakdown into its constituent elements or parts such that the relative hierarchy of ideas is made clear.

SYNTHESIS – The putting together of elements and parts as to form a whole.

EVALUATION – Judgments about the value of material and methods for given purposes.

Figure 1. Bloom's Taxonomy of Cognitive Educational Objectives (1984, 201-207).

Bloom created the taxonomy in an attempt to add clarity and precision to the language of instruction and by doing so thought, "curriculum builders should find the taxonomy helps them to specify objectives so that it becomes easier to plan learning experiences and prepare evaluation devices" (1984, 2). James Madigan opined that,

“Officers should be able to assimilate, analyze, and synthesis information to evaluate the situation. Officers following Blooms taxonomy should be able to compute requirements, generate options, allocate means, integrate the effort and synchronize the fight for what ever mission is assigned” (Madigan 1998, 24). This assessment found in his study of the self-development pillar of leader development clearly defines the objective of synthesis for officer development.

At issue is determining the best method to achieve the synthesis level and the role of institutional training in achieving it. Captain James Pettit neatly summed up the conflict between education and training during a period of intense debate on the issue in 1897.

Where an education is desired for a special kind of work, to be pursued as a means of livelihood, such as engineering, electricity, mining, or for the purposes of the state, such as military education, many of the difficulties disappear, but the general question, as to how much time and labor shall be given to the absolutely utilitarian, and how much to accomplishments and general knowledge which broaden the mind and increase the usefulness and happiness of the individual, remains unanswered. (1897, 2)

Resource constraints provide impetus to the debate between institutional training and education. Time, the most precious of all commodities is the preeminent resource of all.

The noted British historian John Keegan addresses officer training and its rote method to control cognitive mental stressors in his classic book *Face of Battle*:

But beside the achievement of this functional and corporate aim, [adherence to doctrine] the rote-learning and repetitive form and the categorical, reductive quality of officer-training has an important and intended-if subordinate-psychological effect. . . . For by teaching the young officer to organize his intake of sensations, to reduce the events of combat to as few and as easily recognizable a set of elements as possible, to categorize under manageable headings the noise, blast, passage of missiles and confusion of human movement which will assail him

on the battlefield . . . one is helping him to avert the onset of fear or, worse, of panic and to perceive a face of battle which, if not familiar, and certainly not friendly, need not, in the event, prove wholly petrifying. (1989, 21)

Keegan seems to clearly weigh into the debate between education and training of officers on the side of rote training. His model would instruct the young officer to control his emotions and put a stoic face on battle to handle its chaotic and stressful nature.

Once again, George S. Patton has insight into this debate. "In acquiring erudition we must live on not in our studies. We must guard against becoming so engrossed in the specific nature of the roots and the bark of trees of knowledge as to miss the meaning and grandeur of the forests they compose" (Blumenson 1972, 796).

Patton used the term "erudition" in his description of the pursuit of knowledge in his lecture on "The Secret of Victory." Erudition is deep and extensive learning. Rote learning and simple comprehension of rules (tactics) fails to arm officers with the necessary skills to adapt to the complexity of warfare. The ability to apply the correct tactic or procedure while better still falls short of the ultimate objective. Application does require an officer to understand the situation and employ previously learned information (tactics) to achieve a purpose but it is at the synthesis level that he can aggregate dispersed lessons on warfare to formulate a unique solution to the problem at hand.

Infantry in Battle, written in 1939, addresses the issue of military instruction and the use of rules or theory on its very first page.

Since we can not calculate the possible mutations and variables of combat because of the interaction of terrain, enemy and friendly forces. It is training in solving problems of all types, long practice in making clear unequivocal decisions, the habit of concentrating on the question at hand, and an elasticity of mind, are

indispensable requisites for the successful practice of the art of war. (Harding et al. 1939, 1)

Replace elasticity with adaptive and you sum up the instruction required of an officer in Army After Next. Preparing officers for this Army requires an institutional instructional model that will equip them at the synthesis level of Blooms Taxonomy so that they can then evaluate doctrine, tactics, techniques, and procedures as they lead units in the operational Army.

Armed with a better understanding of the theory of cognitive instruction this paper will now proceed with a survey of selected portions of the history of the Army to determine if it has favored one form of instruction and if so, why that form was selected.

CHAPTER 3

HISTORY

The only thing new in the world is the history you don't know.
(Miller 1973, 26)

Merle Miller, *Plain Speaking*

The history of American institutional military training begins with the post-revolutionary creation of the truly American Army. Alexander Hamilton recognized a need for advanced officer education and proposed a full-fledged military university with a basic school to be supplemented by schools for advanced training and thought in military art. This proposal was never realized due to lack of funding and commitment from Congress but it effectively set the stage of continuing education of the officer corps throughout history. The context of Hamilton's proposal is found in the "dual military legacy of the revolution" as outlined by Professor Russel Weigley in his book *Towards an American Army*.

This dual legacy reflects his thesis that two distinct types of soldiers fought the American Revolution. The first group consisted of dedicated revolutionaries committed to the cause of American independence and enlisted for the duration of the conflict. These soldiers formed the backbone of the Continental Army and composed the first regular force in the country. Commander in Chief George Washington wanted very badly to build this force and went to great lengths to man, equip, and train it. Washington believed that in order for the American people to gain their independence they needed a force trained in the image of the British Army it faced.

The militia composed the second group. Their principal motivation was different than that of the Continentals. This group enlisted for much shorter periods, usually a matter of months as compared to the Continentals who enlisted for years or the entire conflict. The motivations of the militia are wonderfully captured in John Buchanan's, *The Road to Guilford Court House*. The advice of a father (Daniel Collins) to his son James candidly lays out what some of these motivations were. He told James that he would be better off in the militia because he would stand a fair chance to survive, less exposed, and less fatigued. If any time to rest presented itself he could come home to do it (Buchanan 1997, 123, 124). Thus the manning, equipping, and training of the field army had two distinct subgroups. The disparity of the capabilities of these two groups created a requirement for careful analysis of the unique capability of each for proper employment and handling in battle.

The best example of proper understanding and application of these two distinctly different units is General Daniel Morgan's victory at the Battle of Cowpens in 1781. Morgan's careful use of each unit based on their unique capabilities and limitations resulted in a rout of Tarleton's combined force. He achieved victory by skillfully combining the effects of his poorly trained but numerous militia with well trained and disciplined Continental line infantry. This holistic approach to applying eighteenth century tactics and techniques with a uniquely American force formed the foundation of a new way of war. After independence, Congress, leery of a standing professional Army consciously committed itself to using mobilized militia and volunteers to defend the nation. This commitment forced the US Army to deal with militia and volunteer

integration each time it faced mobilization of a wartime Army and only exacerbates difficulties in common instruction.

By 1820 Secretary of War John C. Calhoun observed, "The progress of military science has not added much to the difficulty of performing the duty of a soldier or of training him, but it has greatly to that of the officer" (Weigley 1962, 33). Weigley wrote that the "eighteenth century officer was the master not so much of a wide body of theoretical knowledge capable of practical application, as of a set of techniques, analogous to those of a skilled craft but simply of a craft" (Weigley 1962, 40). Thus he can lay claim as a commentator on the conflict between training the officer corps or educating it to apply a recognized set of rules and doctrine. As evidenced in his writings, he believed officers were skilled craftsmen, employing the technical skills of gunnery and military engineering or siegecraft. His analysis clearly reflected the country's answer to the dual military legacy of the revolution. The militia will field the Army responsible for defending the American people from invasion. The education and training system of the officer corps that will lead this Army is linked to the form selected. American officers must be capable of quickly training and integrating a mass mobilized force of militia and volunteers around a core regular force. Maintaining currency and integrating mobilized forces requires some form of institutional training structure. In the next century the first steps were taken in its creation.

William T. "Sherman as commanding general of the Army perhaps accomplished more than any other holder of that office to advance the professional education of the American officer corps, for he was the principal founder of the Army's postgraduate

education system” (Weigley 1962, 81-82). Sherman stressed the need for military education, “Steam and electricity [he wrote] have brought all parts of the earth into such close relations that we are forced into a rivalry with foreign nations in the matter of military education and training” (Weigley 1962, 82). His analysis of education in a time of change foreshadows the constant requirement for professional officer education to this very day.

The struggle to determine and then establish the best form of instruction for officers went through a series of evolutions between 1880-1920. Infantry and Armor Officer Advanced Courses can trace their lineage back to the School of Application founded at Fort Leavenworth in 1881. Sherman desired students at the school to learn by doing. In an effort to relieve students from the tedious duty of frontier Indian fighting, Sherman gave officers an opportunity to immerse themselves in the practical application of infantry, cavalry, and artillery. This combined arms approach to institutional training provides an outstanding model for future training developers. At issue, however, is the balance between education and tactical training for the lieutenants assigned to the course. The requirement to correct or develop competence in tactics competed with a desire to provide a more broadly based education. In 1882, two proponents of the new school, Generals Otis and Pope, declared, “progress made in the prescribed course, both theoretical and practical, has been much beyond what anyone had anticipated” (Nenninger 1978, 26). Their observation reveals a sense of balance between the two requirements that may have been more imagined than real.

A significant development in the evolution of the school occurred in 1888 when a progressive system of instruction was developed. This system started with the basics and moved to more advanced subjects with emphasis on practical application of tactics through the use of field exercises, map and terrain walks. This effort involved concrete methods and little theorizing or abstraction (Nenninger 1978, 28). The struggle for dominance between education in the military art and tactical training had clearly shifted in favor of training.

In the 1890s the implementation of the applicatory method changed this focus. Because the principle innovator, Arthur L. Wagner, "thought the purpose of the school was to improve the officer's efficiency as a leader, not merely to fill his head with facts, Wagner emphasized an analytical approach in studying tactics" (Nenninger 1978, 39). This is a significant development because it emphasizes, "how to think" over "what to think." To produce graduates with this new capability, the school's method of instruction required significant overhaul. If the focus is on, "how to think," a cognitive skill, the learner has the opportunity to present any of a number of right answers. These solutions are based on intellectual skill and previously learned information (Gagne and Briggs 1979, 202). Wagner felt the school's responsibility was to, "immerse officers in the details of a variety of tactical situations, where they could draw their own conclusions regarding a proper course to be pursued" (Nenninger 1978, 43). His keen insight into immersing the students in situations to train the cognitive skills of the leader is just as valid today as it was then. By coupling the progressive system for learning foundation skills with this new emphasis on "how to think" the school provided an institutional

training model capable of handling the infinitely varied circumstances that face line officers on the battlefield.

Adapting instructional methods was not the only component requiring change to enable a cognitive focus. The ability to effectively evaluate a response against an established standard must also be developed in order to provide effective feedback. This standard was created when one of Wagner's contemporaries, Eben Swift, developed the five-paragraph field order. The creation of a standard format to structure student response allowed the school's instructors to provide focused feedback on the students decision making outcomes. The school now had the means to force students to think and produce tangible products for evaluation, not simple application of a drill or technique. The impact of the five-paragraph order being taught at Leavenworth reached the operational Army as students graduated armed with a common body of thought on how to articulate orders to subordinates. This impact provided a first look at the parallel development of professional standards inside the institutional training base and the operational Army.

Another significant contribution of Wagner and Swift in enabling the school to emphasize application over memory was the use of war games. The form of war game they advocated was, "Free Kriegsspiel." This form emphasized rules extemporized by the director of the game, not on a series of tables and calculations to determine battle outcome (Nenninger 1978, 47). This emphasis focused learning on the soundness of decisions and dealing with the uncertainties of combat over blind application of drill or technique. Novel problem solving in a free play exercise with a living, thinking enemy

force demands adaptive behavior by the student. The Leavenworth school method of instruction consisted of the necessary components to balance the dual requirement both to educate and train company grade officers in an adaptive environment. This significant evolution of school methods required another generation of like-minded trainers to follow up on the advances of Wagner and Swift to maintain and update the school as the art of war changed. Unfortunately this consistency was not to be, as the constant struggle to balance education and training once again shifted in favor of training. Before looking at this shift a look at the continued development of the organizational structure and the actors who shaped it is necessary.

One contributing actor influencing the officer corps and its instruction was Emory Upton. Unlike his predecessors, Upton drew different conclusions on the effectiveness of a mass mobilized Army. Upton was the principle proponent for the transformation of the army to an expansive force based on the German model. He advocated the creation of a cadre force with dedicated professional officers to staff the entire wartime army mobilized around them. A severe critic of leadership in the Civil War, Upton viewed the requirement was to educate a full compliment of officers and fill the ranks with volunteers. This necessitated a well-designed incremental approach to the education and training of a professional officer corps. This plan resisted the American solution to the "dual military legacy of the revolution." The politics of resourcing such a force and system had always proven a step too far for the American Government. Upton's refusal to acknowledge this political reality inhibited his ability to create a workable alternative acceptable to both the officer corps and the Congress.

Weigley sums up this incongruence with insightful analysis when he noted, "bad as was any military system founded on armed citizenry, the American militia system was an incredible compounding of evils. The system deliberately ensured that officers as well as men would be untrained, for in 1807 Congress had provided that when any militia unit tendered its services to the United States, it would retain its own officers" (1962, 117). This provision heightens the importance of officer training systems. Not only would the institutional training base be responsible for the regular army but the militia as well. The fact that no real program existed to perform this function in order to create some form of common experience and foundation is astounding. Furthermore, any future institution created to address this deficiency would do so under limitations of available time to train both citizen officers and men. Some of Upton's ideas survived the onslaught of rebuttal when Secretary Elihu Root reformed the Army after the Spanish American War, principally with the creation of graduate military schools and a general staff.

The linkage between the type of Army we have in the United States and the training of the officer corps is asserted not only in the legacy of the revolution but also in the experience of the Civil War. The regular Army disintegrated with southern defections and the sheer size of the manpower required to lead a mass mobilized force required the traditional answer to the "dual legacy." This disintegration made another strong case for the armed citizenry to provide the defense of the nation. Professionally trained officers provided only a fraction of the total requirement to wage this war and it is this legacy that provided the foundation of thought in organizing the direction of the American Army as it began its gradual buildup to the First World War.

Before bursting onto the world stage in World War I, the American Army had to first undergo a series of trials on foreign soil. The campaigns in Cuba and the Philippines tested the American system unlike any previous conflict. The American Army experienced severe growing pains as it transitioned into a force projection instrument of a budding world power. Theodore Roosevelt largely shaped the transformation of the United States. Roosevelt embodied the very essence of the citizen soldier. While the Navy was the recipient of much of his personal attention he indirectly influenced the Army through his former boss in the 1st Volunteer Cavalry, Leonard Wood. As Chief of Staff, Leonard Wood steered the continued evolution of the Army and the instruction of the officer corps that led it.

Wood, like his mentor Roosevelt, was a true citizen soldier. A physician by trade, he became a contract surgeon in the frontier Army and eventually received a warfighting commission through the patronage of Roosevelt. His service in Cuba and the Philippines made Wood well aware of the issues surrounding men in battle. Wood determined that a soldier could be trained in six months (Weigley 1962, 213). It is interesting to note that this estimate is not considerably longer than the four months it took to train a soldier in a Roman legion (Vegetius 1985, 103). Radical change in the means of warfare did not have a corresponding change in the amount of time to train the common soldier. The key difference between the citizen army that fought in World War I and all previous American experience was that it was trained and led by professional officers (Weigley 1962, 221).

The post World War I debate on the organization and manning of the Army is contested by many. Like all previous post conflict analysis, men lined up on both sides of the traditional issue between a larger professional force and an armed citizenry. The task of reconciling the dual American military traditions fell to a veteran of the war, John McAuley Palmer (Weigley 1962, 227). Weigley sums up this chapter in the debate as follows. "Until now the United States has found it necessary to supplement professionals with citizen-soldier conscripts to maintain a limited war army large enough for the occasion. That necessity means that the historic problem of harmonizing the roles and interests of citizen soldiers and professionals in the same army is still alive" (1962, 253).

Weigley's real insight into the issue is the requirement of new technology that divided the officer corps into technical specialties. These skills do not lend themselves to the cultivation of broader and vaguer attributes suitable for high command (1962, 254). The requirement to both train and educate the officer corps remained valid. The impact of the increasing complexity of the tools to wage war combined with the problem of harmonizing the roles of both professional and citizen soldier created a dilemma in how the Army provided adequate instruction in limited time. The military leadership of World War II inherited this dilemma and was forced to quickly answer it to fend off a threat to the nation unlike all previous ones. The architect of this answer George C. Marshall was well equipped to balance the design, mobilization, and training requirements of the force that fights World War II. A true product of previous reforms to increase the professionalism of the Army, Marshall was capable of handling the massive mobilization

of American resources to meet this challenge. The impact of his experiences led him to shape this mobilization Army in a profound way that lasted for well over thirty years.

Marshall's experiences at Fort Leavenworth, Fort Benning, and as a National Guard advisor provide a unique blend of assignments that led him to draw very specific conclusions on the requirements to effectively train officers for combat. In a 1933 letter written to MG Heintzelman, Marshall revealed some of these convictions. "I think we have the best school system in the world, but I also think we are suffering acutely from a lack of practical experience in anything approximating warfare of movement at the outset of a campaign, with inexperienced officers and hastily recruited-up-to-war-strength organizations" (Bland 1981, 409).

The emphasis is on practical experience but he fully understood the type of troops to be led as well. He goes on to opine, "that the *tactics* and *leadership* (italics added) of partially trained troops, is a much, much more difficult problem than for veteran organizations" (Bland 1981, 410). Surely this observation came from his experiences in World War I and as a National Guard advisor. This is an important fact because his understanding of the American solution to the "dual legacy" and the reality of the capabilities of a mobilized army lead Marshall into his advocacy of practical application. The dominance of practical application in Marshall's mind is exemplified in many of his actions. Two examples that illustrate this theme occur during his tenure at Fort Benning while posted there as Assistant Commandant of the Infantry School from 1927 to 1933.

Unlike many, Marshal did not suffer from the affliction of training to fight the last war. Instead, he clearly saw the responsibility to train for a war of movement. In a lecture at Fort Benning entitled, "Development of Tactics," he told the assembled infantrymen, "Our officers are almost entirely without practical experience in warfare of movement. Their fighting was confined to the final phases of static warfare. . . . Yet the great military problem of the United States is the rapid mobilization and concentration of field armies and their early employment in warfare of movement" (Bland 1981, 336).

Not only did he envision the necessity to train for warfare of movement, but he also revealed the difference in the adaptive skills required of the leader in such a war. He accurately predicted the conditions of World War I would not be repeated in the next war. Instead, mobile warfare demanded officers who could rapidly assimilate information on terrain, enemy and friendly forces and then issue instructions in a timely manner. This is indicated when he went on to comment on the effects that occurred after the long lead--time to recon and prepare orders wore off. "The real troubles began--no orders or orders received too late, misunderstandings, lack of information regarding the enemy's new dispositions, the human factor exaggerated to the Nth degree" (Bland 1981, 336).

Marshall's introduction of cognitive mental stressors into the equation of leadership demands further attention. Mental stressors have caused leaders to think when leading units in the face of the enemy since men lined up to throw rocks at each other. By highlighting these stressors Marshall is drawing the attention of the institutional training base to the need to equip officers with the skills and attitudes to handle the stressors they will face in the future. Like Wagner and Swift at Fort Leavenworth, Marshall's passion

to train future leaders by long practice in decision making would enable them to better lead men in conflict.

During his tenure as Assistant Commandant Marshall helped compile the book, *Infantry in Battle* to assist officers trained in peacetime to have the viewpoint of the veteran. In the introduction written by Marshall, he cautioned the reader not to have unreasonable expectations of the training they receive. "Officers who have received the best peacetime training available find themselves surprised and confused by the difference between conditions as pictured in map problems and those they encounter in campaign," (Harding et al. 1939, intro). He went on to explain that this is due to the theoretical nature of the training that fails to account for the frictions of combat. The key to this introduction was the hint at the potential of training the mental process dealing with the difficulties and stresses in order to produce a workable solution.

The contents of *Infantry in Battle* revealed many of Marshall's convictions on leadership and training. The tone of the entire volume is set in chapter one, "Rules," when the reader is instructed that all leaders should familiarize themselves with clear, logical thinking (Harding et al. 1939, 14). Thinking is the cognitive domain. "Marshall valued officers who could think for themselves, even as Morrison had taught him, and he had taught himself, and could remain rational and self directed amid the stress and confusion of battle" (Gorman 1994, 1-34). Morrison was a former mentor at Fort Leavenworth who reinvigorated the instructional methodology after it declined from the heyday of Wagner and Swift. Once again the emphasis is on learning "how to think" not "what to think."

Understanding the convictions of men like Marshall as they tried to correct observed deficiencies in preparing the Army for future conflict, how effective were the training methods of the Army Ground Force in preparing the company grade leadership for World War II? The comments of the men who fought reveal startling similarities between Marshall's beliefs and their experiences in combat. "Commanders of tank units must keep an open, flexible mind. Too often the situation demands the employment of armor in a role totally different from the normal school of thought" (Doubler 1994, 15). This observation mirrors Marshall's purpose in the introduction to *Infantry in Battle*. Here is another telling review of Army Ground Forces attempt to train tank crews for the European Theater of Operations. "The theoretical principles espoused in Kentucky did not align with the realities of combat in North Africa and the Mediterranean" (Doubler 1994, 15).

Perhaps the best battlefield observation came from the men these officers led. This observation validated Marshall's requirement that officers must deal with the cognitive mental stressors of combat and think for themselves. "Troops desired self-control and emotional stability in their Captains and Lieutenants. An excitable officer was ineffective" (Doubler 1994, 238). If Marshall's convictions on leader training correctly forecasted the requirements of company grade leadership in World War II, why did the men who fought note the same deficiencies? Understanding the possible answers to this dilemma requires examination of the training these men received and the organization of the Army in World War II.

Preparing the Army for World War II fell on the shoulders of Lieutenant General Lesley J. McNair, commander of Army Ground Forces. The transition of the American Army to conduct warfare of movement coupled with the sheer size of mobilization presented a tremendous challenge for him. Undaunted, McNair set about training the new divisions in a systematic fashion. Examining the tools available and task to achieve, McNair settled on a series of large-scale tactical exercises to correct the decay of skills in handling large formations that occurred after the Great War. American commanders had not conducted warfare of movement since the Civil War, nor had they fully integrated advances in mechanization or the use of the radio. This necessitated application of the command and control systems in order to experience the frictions associated with such a large body of troops. Marshall and McNair wanted units to make their mistakes training in the United States, not in combat overseas. The training emphasis of the United States rightly shifted to unit training; everything else became secondary.

McNair published a comprehensive system to progressively train divisions, focusing on practical application of current doctrine and new system familiarization. The model and its purpose are well summed up by General Gorman in his book *The Secret of Future Victories*. "Building a division is not like constructing a ship or aircraft. A division is a complex team of teams, a set of concepts shared by over 10,000 individuals" (1994, II-36). Building a team of teams, became the purpose of Army Ground Forces in World War II. To build these teams the "legacy of the revolution" reared itself again. Leaders were now faced with a need to devise a way to overcome the base conflict in the American system of organization and mobilization.

“Junior officers faced two significant leadership challenges in Europe. The US Army was a mass conscript force drawn from a liberal, democratic society, and the first problem facing officers was the fundamental conflict between the need for military discipline and draftee’s desire to retain some form of individualism” (Doubler 1994, 293). “The incongruence in values between the professional officer corps and a mass conscript Army has always existed, and the American Army in Europe was no exception” (Doubler 1994, 294).

The incongruence in values was most pronounced at the company grade level. The bulk of company grade leadership came from reservists and volunteers, not from regular officers. The lack of standard advanced institutional training for both regular and reservist only exacerbated the issue. Regular officers saw an expansion of their rank and responsibility corresponding to the mobilization of national resources. This fact coupled with the 1807 legislation regarding officers in federalized National Guard or militia units highlighted a need for standard advanced officer training at the company grade level. Since post-mobilization training focused on unit training, little time could be spent on developing the perquisite skills of the leader like those Marshall identified at Fort Benning and in *Infantry in Battle*. Company grade officers had to learn by doing. Doing required time. Unfortunately, there is never enough time to prepare during war.

The need to identify men capable of handling the confusion of combat was not lost on Army leadership. The experiences of George Wilson, a company grade officer in the Fourth Infantry Division shows just how important this trait was in trying to become

an officer. After basic training, he and seventy-seven of his fellow graduates signed up for Officer Candidate School.

We were required to go before a board of six officers chaired by a Colonel. They really gave us the third degree. We were asked all sorts of questions, some very personal. Our military bearing and quickness of response seemed as important as the correctness of our answers. It seemed as though they deliberately tried to get us confused, and apparently in many cases they succeeded in doing so, for they eliminated sixty-one and passed only seventeen for admittance to Officer Candidate School. (Wilson 1987, 3)

Later, only five of the seventeen passed the four week Non-commissioned Officer School, the intermediate step before OCS. Only George Wilson and one other received their commission out of the original seventy-eight. This anecdote is important to a study of company grade advanced officer instruction because of what came after the selection and training.

“Soldiers of all ranks relied on their experience, training and judgment to find better ways of bridging the gaps between theory and practice and training and fighting” (Doubler 1994, 298). The environment of combat requires leaders capable of bridging the gap, balancing the tactics, techniques and procedures with a honed skill in making decisions. A good example of this is found in Michael Doubler’s, *Closing with the Enemy: How GI’s Fought the War in Europe, 1944-45*. “The ability of the American Soldier to change his behavior under fire as the living, thinking component of the combined arms team was often critical to success. These adaptations helped bridge the gap between the doctrine and the actual practice of warfare and to adapt to the many differences that existed between peacetime training and combat action” (1994, 227).

The ability to change behavior under fire is the central issue in training leadership at the company grade level. The term adaptive, something that is changed to become suitable to a new situation is used to describe the characteristic today. Marshall taught us in *Infantry in Battle* that the conditions of combat never produce the same situation twice. Therefore, if every situation is new we must train the leader to adapt in order to produce suitable solutions to the problems he faces. The issue is determining the best method to instruct officers to achieve the goal. Is it better to train the leader in the tactics, techniques, and procedures or is it necessary to provide a more broad based education and allow them to apply a set of theory in response to each situation? There is a fundamental difference between the two approaches and while neither exists in a pure form in the institutional training base, emphasis on one form will impact the way company grade officers approach tactical situations and decision making.

Army leaders had little time to answer this question because the immediate drawdown of the World War II Army was followed quickly by the conflict in Korea. Army training remained much as it had and failed to evolve in the intervening years. Once again both ends of the spectrum presented themselves as solutions to the contest between training and education as the struggle for dominance in peacetime continued.

On one end of the spectrum Major General J.C. Fry, in his book *Assault Battle Drill* tried to reinvigorate the McNair model of a team of teams.

It is true that men's mentality cannot be completely readied through training to absorb the impact of battle, but they can be taught through repetitive drills how to coordinate their efforts so that each soldier can move with assurance based on knowledge of what his fellow soldiers are going to do and how his behavior fits into the entire scheme of action. (1955, 6)

According to Fry, the solution to dealing with the chaos of combat at the small unit level is more training in drill. He clearly falls into the Keegan camp of rote training. The focus on individual training in the institutional training base after World War II is a legacy of the requirements of mobilization of the reserves and integration of mass conscripts, a personnel and time decision, and not a training one. The "dual military legacy of the revolution" comes full circle. Well-drilled units will produce tactical success. But what of the cognitive requirement outlined by Marshall?

Another veteran produces a different solution. Lieutenant Colonel Robert Rigg outlines an alternative strategy in, *Realistic Combat Training and How to Conduct It*. His rules for small unit training included all the current components of cognitive and environmental stressors found in FM 22-51, *Leaders Manual for Combat Stress Control*. Of note is his insistence on, "utilize [ing] all possible devices of pressure and suspense" (Rigg 1955, 15). Pressure and suspense provided the essence of rigorous training under realistic conditions in order to make soldiers "think."

By 1973 the Army was ready for change. The history of World War II still hung over the institutional training base and now the Army was "hung over" from Vietnam. Further complicating the situation was a transition to an all-volunteer force. The architect of the coming "revolution" in military training was General William DePuy. DePuy, a company and field grade veteran of World War II and a division commander in Vietnam not only had a vision for the future but the energy to bring it about.

When asked directly about the classic tension between training and education by the interviewer for his oral history, General DePuy responded that he was not sure he had

it right because he had been labeled a trainer (Brownlee and Mullen III 1987, 185). He explained the difference between approaches with, “training tells us ‘what and how’; education tells us ‘why’ and even ‘whether’” (Brownlee and Mullen III 1987, 186). DePuy’s answer cuts to the heart of the issue. Performance oriented training instructs soldiers to perform tasks in a given set of conditions to a prescribed standard. Education places the task into a larger context to better inform and ultimately arm the student with an internalized capability to decide why and whether the task should be performed. For officers education justifies the task to be achieved.

Later in the interview DePuy comments on the notion that soldiers are trained and officers are educated. He flatly denies this statement with the following comment. “I think that is wrong. I think you should train a man for the job he is going to perform, and then you educate him so that the intellectual and moral environment in which he pursues his particular job will be enhanced” (Brownlee and Mullen III 1987, 186). He added, you “train a company commander. You do not educate him, you train him to use tanks, and tank platoons and infantry and antitank guided missiles” (Brownlee and Mullen III 1987, 186). He alluded earlier in the interview that he strongly shifted the focus to training inside TRADOC. One reason for this shift was the lack of time and structure in the institutional base to educate for some future war, only to train for today (Brownlee and Mullen III 1987, 187). Additionally DePuy invoked the complexity of the systems themselves as a limiting factor. He also said education was not “stamped out” but training was brought to equal status. He forecasted a future shift back to education and the reason why it will occur with, “performance-oriented training is so demanding that

weak sisters will begin to drift away from it and drift back to the warm embrace of vague educational goals instead of specific training tasks. You can bet your farm on it” (Brownlee and Mullen III 1987, 187).

DePuy had a historical ally back in 1897. Captain James Pettit wrote about efforts to over complicate the issue in his essay, “Proper Military Instruction” in the *Journal of the Military Service Institution of the United States*. “The tendency of an elaborate system of theoretical instruction is to make war appear complicated and abstruse; and to divert the attention of the student from his present rank and duties, to an idle contemplation of the remote possibilities of the future” (1897, 31).

DePuy seems to be at odds with the convictions of Marshall and the after action reviews of company grade officers and men. However, just as DePuy foretold, the alternative viewpoint is alive and well. Gregory Foster in a *Joint Forces Quarterly* article provides the other end of the spectrum. “Any institution that relies on professionals for success and seeks to maintain an authentic learning climate for individual growth must require its members to read, discuss, investigate, and write” (1996, 111). He finalizes his thoughts with a DePuy like statement that stakes out the exact opposite side of the issue. “The pressure to dilute education with practical training is always present” (Foster 1996, 111). Without labeling Mr. Foster a weak sister, there are distinct similarities between both viewpoints providing common ground for future study. Both men advocate rigor in the instructional environment. Rigor, in DePuy’s case, comes from performing the task to standard, the essence of performance oriented training. Investigating and writing provide the rigor for Mr. Foster in an attempt to internalize the skills of the officer.

Echoing the thought of Gregory Foster is retired Major General Ed Bautz in *Armor* magazine. A decorated combat leader in Creighton Abrams' 37th Tank Battalion, Bautz advocates an educationally grounded officer who applies the principles of war. He goes on to recommend adoption of the principles to avoid becoming a "checklist" Army. "My suggestion is that every soldier, and especially every leader should know the principles of war, what they mean, and how to apply them. Further, these principles should be the primary evaluation criteria for all tactical training and operations" (1997, 21).

Recent history reinforces the necessity of providing an effective means of instruction and mentoring leadership. In a speech given before the Association of the United States Army in October of 1999, Army Chief of Staff General Eric Shenseki told the assembled audience that, "warfighting remains job number 1. And to win those wars, we must train soldiers and grow leaders" (Shenseki 1999). He goes on to add, "there is no greater peacetime priority than preparing the leadership for the next war. We [The Army] are the decisive element of force, and we must be equal to the task" (Shenseki 1999). These words from the Chief of Staff provide another example of the connectivity between execution focus and the importance of training leaders.

Institutional instruction of captains seems to call for some sort of harmony between education and training much the same way as the Army must find methods in harmonizing the integration of reserves into the warfighting force. Achieving this elusive balance has been the quest of many military reformers and training developers.

Perhaps in an attempt to strike such a balance, General Gorman offers an update to the table of contents of *Infantry in Battle* as shown in figure 2. Only those portions that deal with training and education are reproduced. Note the distinction between training at the unit and institutional base and the acknowledgement of a requirement to educate the future leaders of the Army.

Training	In war or peace, never cease to train. A unit invariably gains and loses individual members, and teamwork must be continuously refreshed through practice, or it declines rapidly.
Realism in Training	Training is realistic when it injects the unexpected and the arduous—the frictions, the fog of war; when it exacts casualties as reward or punishment for tactics and techniques; when it pits the force in training against a foe who thinks and reacts as a real enemy would.
Standards	Derive tasks, conditions, and standards for individual and collective training from analyses and experiments with units, in war if possible, in tactical engagement simulation if not.
Simulation	All military training save that from battle itself is perforce simulation; the most effective form of unit training is tactical engagement simulation that faithfully reproduces both the interactions among weapons systems and the friction of combat, and that elicits intense concentration, like that of battle.
Institutional Training/Education	Schools establish the professionalism of the force, but they must perform their mission aware of, and involved in solving, the problems facing unit commanders and other trainers in both the Active and Reserve Components. They must train the trainers, and support them wherever they may be, and they must educate the next generation's Marshalls, McNairs, Pattons, Ridgways, Westmorelands, Abrams, and DePuys.

Figure 2. Extract from Table IV-1 (Gorman, 1994, IV-4, 5.)

Marshall, DePuy, Gorman and Foster all use the term professional or profession in their descriptions of officers and training. A profession is a "vocation or occupation requiring advanced training in some liberal art or science, and usually involves mental rather than manual work" (*Webster's New College Dictionary*, 9th ed., s.v.). The quest for a defined body of knowledge that assists in developing the attributes of the profession of arms has been around since Thucydides wrote the *History of the Peloponnesian War*.

The reason all these men address leadership and the training of officers is because leadership is the principal means to tap into the unlimited potential that exists in every soldier. "The magnificence of our moments as an Army will continue to be delivered by our people. They are the engine behind our capabilities, and the soldier remains the centerpiece of our formation" (Shenseki 1999, speech). Leadership is the fuel to the soldier engine the Chief of Staff speaks about. Soldiers require leadership in order to achieve results. The human dimension demands an effective means of instructing company grade officers in both "how" and "why."

The requirement for effective leadership on the battlefield is well documented throughout history. Like S. L. A. Marshall and John Keegan, DePuy addressed the need in his oral history.

The battlefield is a terrifying place. It is an alien environment for a normal, gentle, human being; most people are not at home on the battlefield, and would prefer to be elsewhere. If they have the choice between being active and inactive, they will be inactive. Still, most of them will do what they are told to do. That tells me we need a lot of instructions going to the soldiers all the time during battle. (Brownlee and Mullen III 1987, 195)

Has anything changed today? The tasks and standards have probably not changed but there is a fundamental change in the conditions brought on by the microprocessor.

The leader tasks on the battlefields of Army After Next (AAN) are not much different than those of their analog predecessors. Active leadership is still the key to high performance units.

What role does doctrine play in the institutional instruction of company grade officers? John Keegan indirectly addressed this question in *Face of Battle*. In a discussion on a procedural approach to war he wrote:

The most obvious manifestation of the procedural approach to war is in the rote-learning and repeated practice of standard drills, by which one does not mean the manual of arms practiced by warriors since time immemorial to perfect their individual skills but a very much more extended range of procedures which have as their object the assimilation of almost all of an officer's professional activities to a corporate standard and a common form. (Keegan 1989, 20,21)

"Professional activities to a corporate or standard form" sounds like task, condition, and standard in today's training lexicon. Doctrine, tactics, techniques, and procedures provide the hierarchy for Army training literature. Doctrine is an expectation of how you will fight. Does doctrine expect rigid adherence to a particular form or tactic to solve a battlefield problem?

No, instead, US Army doctrine has expected company commanders to think and adapt on the battlefield for a long time.

We are many years behind in our methods. We talk glibly and knowingly about the increased individuality and responsibility of company commanders under the new battle conditions, but we have taken care to suppress all cultivation of those qualities in time of peace. Individuality with good judgment, and a willingness to assume responsibility when thrown on his own resources are admirable qualities to cultivate. (Pettit 1897, 39)

Those words could have been written during any interwar period in the history of the United States Army. They were written over one hundred years ago in an effort to

describe the struggle to transition from closed to open order tactical formations. The shift to open order had a corresponding increase in the responsibility of the company commander during execution.

The company is the first layer of command for many reasons and institutional training at the company grade level is at the fault line between rigid drill and adaptive situational dependent action. The mission of the company team requires the commander to understand the influence of terrain, enemy and friendly forces as they constantly interact and then arrange his forces to solve a problem or meet a new situation (tactics). Neither Army leadership nor our doctrine desire rigid drill at the company level as the principle means to solve tactical problems. FM 71-1, *The Tank and Mechanized Infantry Company Team*, outlines the steps of actions on contact at company level. This process shows that the company level is where drill meets tactics for the first time.

The four-step process is not intended to generate a rigid, lockstep response to the enemy. Rather the goal is to provide an orderly framework that enables the company team and its platoons to survive the initial contact, then apply sound decision making and timely actions to complete the operation. (1998, 3-16)

The conflict between educating or training our Army is not new. The requirement for the institutional training base to provide leaders capable of adapting to a changing battlefield environment is a consistent trend throughout our history and will remain so in the future. In his essay *Leadership in the XXI Century*, Colonel Richard Geier, notes, “it is doubtful that in the future an icon or a TV screen in a tank will instill the courage and inspiration to cause soldiers to risk their lives in battle” (Geier 1999, 1). Later in the same essay he explained the relationship between technology and the leader with, “technology

does not make the job of a leader easier. It does give a leader more tools. Deciding which tool to use is what will make future leadership more difficult” (Geier 1999, 6).

Adding emphasis to Colonel Geier’s remarks is a former commander of the Army’s first digital brigade. In an interview capturing his experiences and thoughts, Colonel Rick Lynch discussed the importance of repetitive experience in the digital age.

I contend that one of the differences between fighting on today’s battlefield and a Force XXI battlefield is mental agility, and that does not come overnight. It takes repetitive training for a young lieutenant, a young captain, a young major, a young lieutenant colonel, a young colonel, to get them to be able to respond to situations where they have to make quick decisions and be mentally agile. That only happens through repetitive leader training. (Lynch nd)

Our narrative of two-hundred-plus years of institutional instructional history ends where it began. The Army continues to struggle between the necessity of providing industrial age leaders for our wartime mobilization units and the need to provide a broad based educationally grounded one. With few exceptions the Army has resolved this dilemma by tipping the scale in favor of systematically training leaders with heavy emphasis on applying the techniques and procedures necessary to produce cohesive teams in battle. The requirement to train leaders who adapt to new situations argues for a more balanced approach. General Gorman concludes we must, “Learn from the mistakes of the twentieth century how to fasten a future force for the twenty-first century” (1994, IV-5).

Given this framework of the theories of cognitive instruction and how Army officer instruction evolved over the last two hundred plus years, has TRADOC learned from this history? Have they (TRADOC) observed advances in cognitive instruction and

adapted institutional methods to meet the demands of the future force? It is now time to look at these advances and apply them to training in the institutional base.

CHAPTER 4

ANALYSIS

In 1903 the school had adopted a method of map exercises newly developed from the French. Two officers out of a class were given problems to work out on a large glass-encased map and at the end of an hour or so were required to explain and defend their solution before the class, which also heard a critique from the instructor. (Prouge 1963, 99)

Forrest C. Prouge, *George C. Marshall*

So far, this study has outlined the theory of cognitive instruction and provided a framework describing both ends of the instructional spectrum. History was applied to the framework and trends identified in the method of instruction inside the institutional training base.

This chapter will analyze current methods of instruction in the Armor Captain's Career Course to illustrate TRADOC-wide characteristics. First, a comparison of TRADOC regulation 351-10 and the requirements developed in chapter 2 will determine if the training regulation is consistent with the theory of cognitive instruction. Second, an examination of current instruction will determine if the current Armor Course provides instruction in accordance with the regulation. The third section will analyze the Armor Course against the theoretical framework to determine if it meets the requirements for instruction in the cognitive domain. Next, analysis of the impact of the microprocessor and connectivity on the classroom environment will reveal significant opportunities to evolve instructional techniques. The last section synthesizes the various analyses in order to provide a comprehensive set of requirements or objectives for cognitive

instruction and describe the classroom environment. This synthesis will be used in chapter 5 as a basis for an updated model.

Figure 3 illustrates the four components of cognitive instruction presented in chapter 2. The first component is a stepwise approach to allow the student to assimilate disparate lessons and components. Repetitive experience assists in the formation of solution sets and practice in situational assessment. The third component, feedback, illustrates cause and effect relationships between student decision and mission outcome. The last component, execution focus, provides opportunity to provide solutions and establish the outcomes necessary to determine potential causes. Execution focus had three sub-components, situational assessment, requirement anticipation and creative thinking (problem solving).

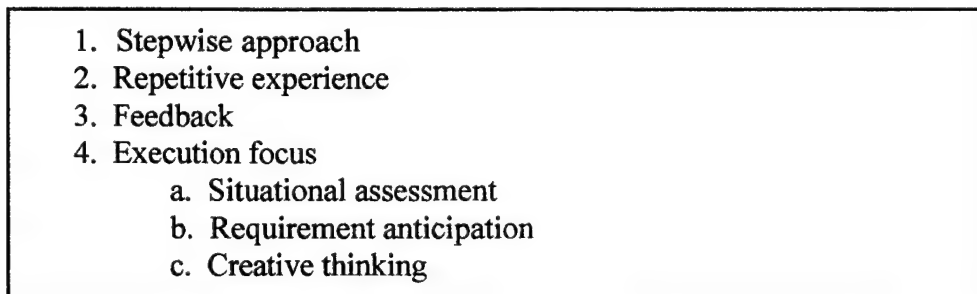
- 
1. Stepwise approach
 2. Repetitive experience
 3. Feedback
 4. Execution focus
 - a. Situational assessment
 - b. Requirement anticipation
 - c. Creative thinking

Figure. 3. Cognitive requirements outlined in chapter 2.

TRADOC Regulation 351-10, *Institutional Leadership and Education*, govern institutional instruction. The goal of the officer education system is to produce “broadly

based officer leaders who are fully competent in technical and tactical and leader skills, knowledge and behaviors . . . can operate in an environment of complexity, ambiguity, and rapid change . . . can adapt and solve problems creatively” (TR 351-10 1997, 15).

Further, leader development is, “a continuous and cumulative process of education and training, experience, assessment, remediation, reinforcement and feedback.” It “is an integrated, progressive, and sequential process that involves institutional training and education, operational assignments, and self-development” (TR 351-10 1997, 6).

Section 2-2, institutional training, specifically addresses the responsibility of the institutional training base. Four objectives outlined in the section directly relate to this study. The goals provide a basis of training objectives designed to:

1. Produces leaders who have ability to execute doctrine and strategy.
 2. Develop leaders capable of planning and executing worldwide peace and wartime missions in a wide range of operational environments.
 - a. Plan and execute independent operations within the commander’s intent, show initiative, take calculated risks, and exploit opportunities.
 - b. Effectively integrate advanced technology with the human dimension to demonstrate tactical and technical competence in building cohesive teams.
- (TR 351-10 1997, 28)

The regulation also describes the conditions of the instructional environment.

Tasks will be trained and evaluated under conditions approximating operational environments for projected peacetime and wartime missions. During training, students will be exposed to frequently changing and progressively more difficult conditions. Small group leaders and instructors will insert realistic situational changes, which require progressively higher performance levels. (TR 351-10 1997, 7)

Like conditions, standards for instruction are outlined in the regulation. The standards will, “equal or exceed requirements for successfully performing tasks or related missions in an operational environment” (TR 351-10 1997, 8).

The regulation has a separate definition describing progressive and sequential training.

Training is progressive when tasks in the same general subject area are sequenced to require increased levels of performance proficiency and/or supervisory responsibilities. Training is sequential when tasks in the same general subject area are ordered and trained in a sequence allowing students to build on and/or reinforce previously acquired skills, knowledge, and behavior. (TR 351-10 1997, 27)

The first step in this analysis is an examination of requirements outlined in chapter 2 against TRADOC regulation 351-10. I have condensed the objectives, conditions, and standards of TR 351-10 into one set of requirements to facilitate comparison with the requirements outlined in chapter 2. Figure 4 illustrates the condensed requirements.

Chapter 2	TR 351-10
1. Stepwise approach	1. Execute doctrine
2. Repetitive experience	2. Plan/execute independent operations
3. Feedback illustrating cause and effect	3. Integrate technology with human dimension, build cohesive teams
4. Execution focus	4. Changing progressive conditions
a. Situational assessment	5. Equal or exceed standards of operational environment
b. Requirement anticipation	6. Progressive and sequential training
c. Creative thinking	

Figure. 4. Condensed requirements from chapter 2 and TR 351-10.

The first requirement, stepwise approach, is consistent in both the theory chapter and the regulation. Each recognizes the validity of a sequential or stepwise approach to sequencing instruction to facilitate learning. Repetitive experience is not addressed in the

training regulation. While the conditions section hints at repetitive experience inside the progressive system it is not explicit in outlining a requirement or value in repetitive experience. Like repetitive experience, feedback is not addressed in the regulation. This may be due to the almost complete incorporation of the after action review by the Army. The requirement outlined in chapter 2 makes the additional distinction in feedback in that it should illustrate both cause and effect. This distinction is important because illustration of cause and effect is dependent on the execution of tasks. Both the requirements outlined in chapter 2 and the regulation address execution. Each focuses the energy of the student on execution of battlefield missions to achieve results in a given situation. Chapter 2 further outlines the components of execution as situational assessment, requirement anticipation, and creative thinking.

Additionally, TRADOC Regulation 351-10 incorporates integration of technology with the human dimension to build cohesive teams. This is an update to the "Team of Teams" theme throughout our Army's history of institutional instruction. This topic will be addressed separately in this chapter with analysis of the potential changes in the instructional environment brought on by the microprocessor. Before analyzing the potential changes, a description of the current method of instruction inside Phase I of the Captain Career Course at Fort Knox, Kentucky, is necessary.

Current instruction in the Armor Career Course follows a specific path or warrior trail as outlined in figure 5. A description of the course taken from the website of the 3/16 Cavalry, the unit responsible for execution of the Armor Career Course, provides a narrative explanation of figure 5.

Battle Captain 35 Days	Foundation Training	Test Point 1	BDE Offensive Operations (IPB & MDMP)	Test Point 2	BN Offensive Operations (OPORD)	Test Point 3	Battle Captain (Prepare & Execute)	Test Point BC
	5 Days	1 Day	14 Days	1 Day	11 Days	1 Day	5 Days	1 Day
Company Commander 23 Days	Company Team Offense	Task Force FTX (CCTT)	Company Team Defense	Test Point 5	Task Force Defense FTX			
	11 Days	1 Day	10 Days	1 Day	1 Day			
Staff Officer 23 Days	Battalion Defense Operations	Test Point 6	Brigade Defensive Operations	Test Point 7	Brigade Defensive Command Post Exercise			
	6 Days	1 Day	4 Days	1 Day	7 Days			
Company Commander 15 Days	Stability & Support Operations	Test Point 8	Company Command (Training, Gunnery, Supply, Personnel)	Career Course Phase I Graduation				
	3 Days	1 Day	4 Days	1 Day				

Figure. 5. Armor Career Course Warrior Trail.

The Career Course executes training in 10 volumes. Volume 1 provides foundation of training through the study of Army doctrine and language and other fundamental tools used throughout the course. Volume 2 is the study of the Army's decision making process and brigade-level Offensive Operations. Volume 3 focuses on the battalion-level offensive operations and the writing of a 5-paragraph operation order. Volume Battle Captain demonstrates to the students how to develop agile tactical plans and then demonstrates how a battalion staff prepares for and subsequently executes a tactical operation. Volume 4 focuses on the execution of company-level offensive tactical tasks through the presentation of oral operation orders and simulated combat (SIMNET or CCTT). Volume 5 focuses on the execution of company-level defensive tactical tasks through the presentation of oral operation orders and simulated combat (SIMNET or CCTT). Volume 6 is the study the Army's defensive doctrine. In volume 6, students plan a Task Force-level defensive operation. Volume 7 focuses on brigade defensive

operations and culminates with the execution of a 4-day CPX (BBS). In Volume 8, students learn about stability operations and support operations. In Volume 9, students are provided valuable training associated with commanding a company. Instruction is performed in small groups consisting of fourteen to sixteen students. (3/16 Cavalry 1999)

Student officers usually come to the Captain's Career Course from their first operational assignment, which typically lasts three to five years. One or two allied officers, Marines, and sister branch officers are integrated into each small group. After eighteen weeks of instruction US Army officers attend Phase II of the Career Course, the Combined Arms Service Staff School (CAS3) at Fort Leavenworth. During their tenure in phase I, the Armor Career Course officer executes mission orders he or another student planned three times. Once each during company team offensive and defensive instruction, and once during the brigade capstone exercise. Execution at the company team level is done in a virtual simulation, either the close combat tactical trainer (CCTT) or its precursor the simulations network (SIMNET).

Since the students man all the crew positions in each vehicle, only one student in each small group is afforded the opportunity to perform duties of company commander. Student's rotate positions after each training exercise but insufficient repetitions prohibit every student from getting the challenge of command. An after action review by the small group instructor allows students to vicariously learn from their classmates mistakes. "I would never do it that way" is a common utterance in the background of these AAR's. Unfortunately the lack of repetitions usually allows the utterer to escape proving his way is any better.

At the brigade and battalion task force level, execution is done in a command post exercise using the constructive simulation, Brigade Battle Simulation (BBS) to drive staff responsibilities and situations. Students fill various staff positions at each level under the command of a field grade officer. An observer-controller team monitors the exercise and provides performance feedback. The battle captain exercise deals with information processes and procedures inside a battalion command post. This exercise requires students to understand and then apply the principals of information management in the context of a mission. There is no field training exercise during phase I of the Career Course. All execution is done in constructive or virtual simulation.

Enabling learning objectives focus on planning tactical operations. Examinations require the student to produce plans and orders only; there are no examinations on execution of orders. This is the endstate of the course as summed up by the 3/16 Cavalry commander's intent found on the unit website.

The purpose of the career course is to provide attending captains the basic tools required for a career of service to the Army. The endstate of the career course has captains trained to assist in planning operations at the brigade level, trained to plan operations at the battalion level and trained to execute operations at the company level. Key tasks for the course include the execution of battle captain training, execution of company level operations under simulated combat conditions, and execution of Command Post Exercise (CPX) as a battalion or a brigade-level staff officer. (Mills 1999)

This study has already analyzed the requirements found in chapter 2, Theory, against TRADOC Regulation 351-10. Next is analysis of the current method of instruction to the regulation and then to the requirements in chapter 2. The requirements of 351-10 are summed up in figure 6.

1. Execute doctrine.
2. Plan/execute independent operations.
3. Integrate technology with the human dimension, build cohesive teams.
4. Changing progressive conditions.
5. Equal or exceed standards of the operational environment.
6. Progressive and sequential training.

Figure. 6. Condensed requirements from TR 351-10.

The current Career Course achieves item one, the training of student officers to execute doctrine in that it exposes the student to current operational doctrine at the brigade level and below.

It does a reasonably good job at training students to plan independent operations inside the commander's intent. It does not adequately train students to execute those operations because of the limited number of iterations at each level. Each student plans a number of operations during the course but once again there are very limited opportunities to execute the plan. Without this opportunity many students come away from the experience with unreasonable expectations of their ability because no cause and effect relationships were established between the planning and execution functions.

The current course has no provisions for the inclusion of information technology and therefore fails to meet the third requirement. A short digital instructional experiment was conducted in 1997 for soldiers going to Fort Hood but there is no class wide instruction on digital systems.

Like the execution of independent operations, the current course has limited ability to challenge students by changing the situations and making them progressively more difficult. The course has the structure to change conditions by the insertion of new or updated information, tasks, and others; however, the ability to perform this is inhibited by the instructional environment and the time allocated for each exercise. Notice that both field-training exercises (FTX) in figure 5 at the battalion-company level last one day. The amount of time devoted to the exercise is not constrained by resourcing or scheduling the CCTT facility. Institutional instructional has priority of scheduling; therefore, the limitation is by design. The seven-day command post exercise includes orders preparation. Only one iteration of the fight occurs in the seven-day period. These severe time constraints do not lend themselves to changing or progressive conditions, only enough time is allocated to complete the exercise as planned.

Item five, equaling or exceeding standards of the operational environment, provides incredible challenges for armor leadership. There is a significant difference between the mission training plan (MTP) requirements to train a collective task to standard and institutional training base resources. Since the Career Course trains leader tasks, direct comparison of MTP task, condition and standard results in faulty analysis. The Career Course should train the leader tasks associated with the collective task under the same conditions and to the same standard. The collective task, Attack by Fire (71-2-0219) provides a suitable example to examine the ability to instruct leader tasks. Figure 7 is an extract from *Army Training Evaluation Plan 71-1-MTP*, highlighting the task,

conditions, and standards for attack by fire. The figure also includes the leader tasks associated with Attack by Fire.

Examination of the task, conditions, and standards reveals the fundamental shortfall in the current Career Course. Students never operate a tank or Bradley vehicle system. This issue adversely impacts the ability of the Career Course to train the leader tasks associated with the collective task. Leader task number one (selection of the ABF position) can and is trained in the current course. The second leader task involving indirect fires can be adequately trained in virtual or live simulation. The last leader task exemplifies the inability of the current course to provide instruction that equals or exceeds the standards of the operating environment. Previous analysis has shown the lack of time devoted to instruction at *directing* tasks. *Directing the ABF mission to completion* is linked to the requirement of execution focus. The current structure of the course fails to provide an environment that allows all students to direct companies and therefore fails to meet the requirement as outlined in TR 351-10.

Chapter three posed the theme that the company commander is at a fault line between drill and adaptive situational dependent action. Divorcing students from the environment in which they will lead has a dramatic effect on the institutional training base's ability to meet the criteria outlined in TR 351-10. There are obvious resource implications involved but what is the cost of failing to meet the objective standard? Instruction is progressive in that it is sequenced to isolate the decision making process at each command level and then trains it again with different conditions. Overall, of the six requirements outlined in TR 351-10, the Armor Career Course adequately performs only

TASK: Attack by Fire (71-2-2019)

CONDITIONS: The company team is operating in a tactical environment as part of a battalion task force that has made contact with a moving or stationary enemy. The task force commander orders the company team to conduct an attack by fire (ABF). Enemy contact is imminent. Indirect fires and intelligence assets may be available to the company team. Some iterations of this task should be performed in MOPP 4.

TASK STANDARDS: The company team maneuvers to and occupies the ABF position. It places effective direct fires and (if applicable) indirect fires on the enemy element, destroying it or causing it to withdraw. No friendly unit suffers casualties or equipment damage as a result of fratricide.

LEADER TASKS

1. Company team commander selects an ABF position and issues a FRAGO.
 - a. Evaluates the situation.
 - b. Selects ABF position that allows the company team to effectively engage the enemy and that provides adequate cover and concealment for the company team.
 - c. Issues a FRAGO to the company team addressing changes in the friendly and enemy situations and directing the company team to occupy the designated position.
2. Company team commander and/or FIST employ indirect fires.
 - a. Select and occupy positions affording clear observation of the enemy force.
 - b. Call for and adjust suppressive fires against the enemy to allow the company team to occupy the ABF position.
 - c. Call for and adjust indirect fires to suppress, obscure, or destroy the enemy force.
3. Company team commander and platoon leaders direct the ABF mission to completion.
 - a. Orient subordinate elements and focus and distribute direct fires against identified enemy elements.
 - b. Shift, refocus, and redistribute direct fires as necessary to destroy identified enemy elements.
 - c. Direct the shifting of indirect fires to suppress or destroy enemy vehicles or positions.
 - d. Lift fires to facilitate the movement of friendly elements or when desired target effects on the enemy have been achieved.
 - e. Issue additional FRAGOs to direct or retask subordinate elements as required to conduct a tactical task.
 - (1) Assault an enemy position.
 - (2) Clear a trench line.
 - (3) Knock out a bunker.
 - f. Send SPOTREPs and updated SITREPs and make recommendations to the higher commander as necessary.

Figure. 7. ARTEP 71-1-MTP Attack by Fire extract (ARTEP 71-MTP, 5-39,40).

one, progressive and sequential training. Three others; executing doctrine, plan and execute independent operations, and changing progressive conditions, yield both positive and negative results. The negative results stem principally from a focus on planning and an almost complete exclusion of execution. Items three and six, integration of technology and operational environment are not addressed by the current course due to complete absence of digital systems and a lack of training on the physical systems the captains operate (e.g., tank and Bradley).

Examination of the current Armor Course in light of the requirements of the cognitive domain found in chapter 2 reveals corresponding results. The requirements in chapter 2 are outlined in figure 8.

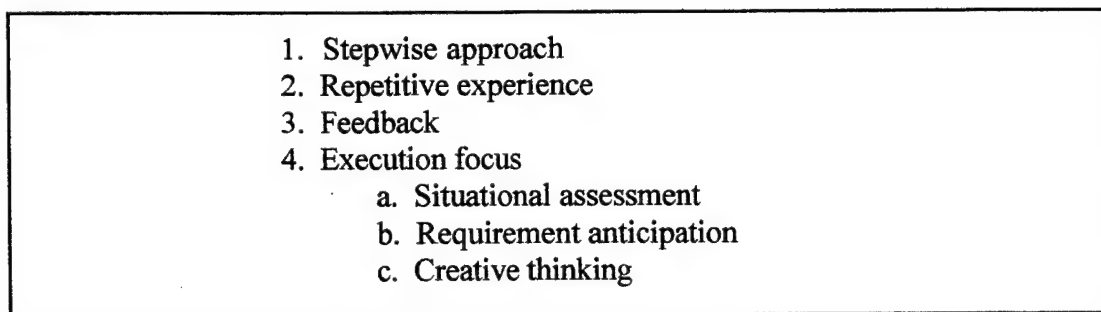
- 
1. Stepwise approach
 2. Repetitive experience
 3. Feedback
 4. Execution focus
 - a. Situational assessment
 - b. Requirement anticipation
 - c. Creative thinking

Figure. 8. Cognitive requirements outlined in chapter 2.

The course has a fundamentally sound, stepwise approach to training. The method can be improved and discussion of potential improvements will be presented latter in the thesis, but the overall method adheres to the requirements of a stepwise approach of instruction in the cognitive domain.

Analysis of item two, repetitive experience, reveals a significant shortfall. The current course does not provide repetitive experience in any task at the same command level. While the decision making process is repeated throughout the course, students move from one command level to another without repetitive experience. At some levels, the company in particular, students are fortunate to get an opportunity to execute once, much less repeatedly.

Students receive adequate feedback from instructors and classmates. The instructor provides a critical link in the entire process. Instructors cannot provide feedback on unobserved behaviors or in a frequency that prevents unnecessary mistakes. Optimizing the instructor's time with increased availability and fidelity of student work could greatly enhance both quantity and quality of feedback.

Significant difficulties in execution focus have already been revealed in previous analysis. Divorcing students from execution is a very dangerous path for the institutional training base. Because execution is as "five is to one" (Nye 1993, 99) as Patton taught us, this lack of execution creates second and third order effects on the rest of the instructional process. Developing student abilities to conduct situational assessment, anticipate requirements, and think creatively are all hindered by the lack of execution. Moreover, any feedback given to the student fails to illustrate cause and effect relationships, the very foundation of the Army's after action review process used as the learning model.

Overall, the current Armor Captains Career Course lacks the necessary structure to provide adequate instruction in the cognitive domain. Analysis of the impact of the microprocessor and connectivity reveals significant potential change in the physical

environment and instructional capability. What are these changes and how have they evolved in the years since the first revolution in Army training? A brief interlude in our analysis should help discover the many forces influencing our capability to provide adequate cognitive instruction.

The microprocessor has fundamentally altered the instructional environment in the Army because of its adoption as the means to analyze and present information about the terrain, enemy, and friendly forces. Army Tactical Command and Control Systems (ATCCS) and Future Battlefield Command Brigade and Below (FBCB2) systems provide a daunting challenge for training developers to provide effective integration into the curriculum of the career course.

Since phase I of the Career Course is limited to Brigade sized and lower units, FBCB2 provides a suitable focus. While FBCB2 is not a fully fielded operational system, the current Career Course can address many of the skills necessary for adoption as the Army transitions. More important, the microprocessor and fiber optic connectivity has had significant impact on the very nature of cognitive instruction by altering the instructional environment.

Computer-based instruction provides sequential instruction tailored to the individual needs of each student. For many tasks, the knowledge, comprehension and application levels of Bloom's taxonomy can all be reached by computer aided instruction. TRADOC has embarked on an extensive campaign to design and field computer aided instruction in the last few years. One impetus for this quest is distance learning and the Total Army Training System or TATS. TATS mandates equality of instruction between

Reserve and Active component soldiers, the very issue raised by the “dual military legacy of the revolution” discussed in Chapter 3. Numerous proponent schools have explored computer-based instruction as a means to achieve this mandate.

Connectivity and the ability to share information are perhaps the most significant change to the instructional environment. The ability to rapidly transfer large amounts of data from one system to another provides an unprecedented opportunity to harness the computing power of the microprocessor. The essence of performance oriented training is just that, performance of the task. Since many of the tasks in the Career Course involve planning tactical missions and the production of orders, connectivity provides a means to share the compartmentalized information. Moreover, connectivity provides an environment whereby individual instructional components can be reused in different ways. For example, a doctrinal manual could have animation illustrating a particular doctrinal concept. This same animation could also be used inside a computer aided instruction module to illustrate or teach the same point. Connectivity also allows the instructor to bring up the animation in the classroom to illustrate the point to his class. Thus, this same object residing in a database was reused in three different ways because we could reassemble it to fit unique needs.

Connectivity provides the true power behind the revolution the microprocessor promises. Computer based instruction and connectivity provide unprecedented opportunity to structure instruction in a stepwise manner and provide both repetitive experience and tailored feedback.

One noted defect in the design in many computer aided instruction systems involves feedback and the stepwise approach. As early as 1996 the Armor School developed an innovative solution to this shortfall. The instructional design of the "MDMP Tutor" incorporated two components that mitigated many difficulties in bringing effective cognitive instruction to a student via a computer. The first solution was the creation of simple "gates" at various steps of the learning process. These gates checked student mastery of material before allowing them to proceed farther in the courseware. While this device is not new in and of itself, its use when combined with the second solution proved very innovative indeed.

The tutor system maintained the human instructor inside the instructional process much the same way he would in a traditional classroom. By capturing student work and sending it to the instructor, the system optimized the instructor's time allowing greater emphasis on corrective feedback. The instructor opened the gate allowing the student to continue the courseware only after the student displayed mastery of the material. The success of this innovative design is validated by its inclusion in the subsequent design of the Armor Captains Career Course Distance Learning. The stepwise approach, instructor in the loop, and gate controls were further developed and implemented.

Chapters 2 and 3 both highlighted the importance of establishing cause and effect relationships in instruction. Have the microprocessor and optical connectivity increased the ability to capture and illustrate cause and effect? They have fundamentally altered the ability to capture cause and effect relationships principally through the use of constructive and virtual simulation. These simulations allow the student to *direct* the

actions of subordinate elements, the significant shortfall identified in previous analysis. More important, these simulations allow an instructor to visualize cause and effect relationships for the student to enable examination and evaluation. The use of simulations is the essence of practical application advocated by institutional instructors since the 1880s.

Desktop simulation advancements are powered by the increased computing capability of the microchip. These increases allow a corresponding increase in simulation fidelity. Simulation provides students with an opportunity to experiment with potential solutions to complex problems in short amounts of time, thus completing instructional connectivity between execution, cause and effect and repetitive experience.

The ability to visualize the battlefield has also been advanced by the microprocessor. Three dimensional models and graphics provide a robust and lifelike model for understanding the relationship of terrain, enemy, and friendly forces. The ability to add the feeling of depth affords an incredible opportunity to better understand terrain and its effects. This added dimension becomes even more important in an era of decreased opportunity to conduct live training and increased deployments to worldwide locations.

This chapter has now outlined the ability of the Armor Career Course to provide instruction in accordance with TR 351-10 and cognitive instructional theory. Additionally, the brief look at the impact of information technology on the instructional environment illustrates room for potential change in instructional methods. Next, a

synthesis of the results will provide the necessary framework of any update to the instructional model. Figure 9 combines the results and leaves the following framework.

1. Stepwise approach with progressive conditions.
2. Repetitive experience.
3. Execution focus in the operational environment.
4. Situational assessment.
5. Requirement anticipation.
6. Creative thinking.
7. Feedback illustrating cause and effect.
8. Integration of technology with the human dimension to build cohesive teams.

Figure 9. Synthesis of the requirements for instruction.

This synthesis provides a suitable point of departure to create a new model, capable of providing cognitive instruction in our institutional training base that will meet the needs of captains. If the Army is to remain true to the goal of the officer education system, developing leaders who can operate in an environment of complexity, ambiguity, and rapid change and adapt to solve problems creatively (TR 351-10 1997, 15), it must adapt an instructional model to provide it. Clausewitz posed that there is only one lubricant to the pervasive friction in war, experience (Clausewitz 1986, 122). The model should assist the officer by providing experience and feedback in order to better understand what that experience means.

CHAPTER 5

MODEL FOR TRAINING

We need a tactical school which shall develop our thinking qualities instead of filling our heads with a lot of unarranged, undigested information. (Pettit 1897, 47)

Captain James S. Pettit, "Proper Military Instruction"

In the introduction to his essay outlining a model training program for company grade officers entitled, "The Lyceum At Fort Agawam," Captain Eben Swift set the stage with the following passage.

Some armies have been improved only in defeat. In others the reaction after a successful war is often worse unless there is prospect of another war. Thirty years of peace frequently fixes many customs and traditions in an army that can only be uprooted by a new and terrible emergency. When that time comes we may be sure that other systems of peace training will be adopted, and that the new will only flourish if it is built upon the ruins of the old. (Swift 1897, 234)

Unfortunately, it is necessary today to uproot considerably more than the thirty years of custom and tradition Captain Swift lays out.

In 1897 Captain Swift asked his readers to go "to that blessed clime where ignorance doth not enter and where tradition is a blank. I ask you now to follow me, over many leagues of space and time, to Fort Agawam on the borderland of our most distant possession" (1897, 234). In the year 2005 it is time to revisit Fort Agawam in order to observe some of the changes in instruction of company grade officers.

A most startling event occurred on the first day of inprocessing. Each student had arrived the previous week to sort out all the complexity of uprooting himself and his family to a new location. That done, each officer reported in on the appointed day to

start instruction at the lyceum. Officers sat behind a laptop computer in the auditorium, all 84 of them. The commander of the squadron walked up to the podium and welcomed them. After the usual welcoming remarks and greeting he focused their attention to the screen behind him. "You don't know what you don't know" was printed in large block letters, dominating the entire screen. The commander then made a simple yet profound prediction. By the end of the course each officer would better understand what they did not know, moreover in the next twenty weeks they would be challenged to change or adapt their behavior countless times in order to solve all types of problems. The weakest muscle in their body, that between their ears, would be exercised daily.

The commander then showed the assembled officers a slide depicting the instructional objectives. The slide had eight simple bullets describing the tasks the officers would be capable of performing after completing the course. Included was an ability to formulate plans at the brigade level and produce plans at the battalion/company level. Additionally they would coordinate battalion operations and direct company team operations. Each officer would be able to produce operations orders, fragmentary orders and warning orders. Additionally they would be able to effectively create both oral and written communication. The last bullet addressed leader behaviors, for the lyceum understood that the course was designed to create the competent leaders required to lead soldiers in battle. Thus each officer clearly understood the endstate of the course; all they needed now was enough determination to get there.

The officers then signed the necessary forms and took possession of the computer before them. This device was to be one vehicle for interchange with both instructors and

classmates. But the day's most surprising event was the fact that they were sent home with this device for the next two weeks. After further guidance from their small group instructor, officers understood where to log in and complete the self-paced instruction required by the time they would meet again.

Collectively the officers represented everything happening in the Army. Veterans of numerous deployments and training events, they each brought considerable experience and expertise to the lyceum. In many ways the non-contact hours of the first two weeks represented both reward and acknowledgement that these soldiers had been operating at a frantic pace and deserved a transition period. More important, the two weeks represented a significant challenge for many. Each officer would take a series of lessons on-line, feeding an immense database with answers to questions during instruction on the theory of the military decision making process. The process was little changed since its inception and immediately familiar to them. The environment, however, was considerably different.

The first noticeable difference was the location of the training scenario. Many thought the terrain database would be one of the many deployment locations or even their favorite haunt, the training center. Instead, the training scenario was based on the very ground they lived on, for the lyceum believed it was essential that these officers apply themselves in the real conditions they found themselves in, not some imaginary absurdity of fictional terrain or some far off distant land many could only vaguely imagine. Fort Agawam was surrounded by gently rolling farm country, punctuated by the urban sprawl of the major city to its south and located on the banks of a large river. The terrain

provided all the reality of the world that they needed, for it was far more important that they have an opportunity to visualize the same terrain in both a virtual, synthetic environment and also rub the soil between their fingers. The full importance of this will become clearer when we see more of the events inside the lyceum.

The second difference in the instructional environment was that while they were physically separated from their instructors and classmates for the first two weeks; their actions were not. Instruction was performed on-line; students were monitored constantly, their activity stored in a database with results further monitored by the instructor. Everything from the amount of time they spent on a lesson to the answers given to any of the numerous practical exercises imbedded in the instruction was captured.

The instruction was divided into a series of progressive exercises based on an evolving tactical scenario. Each officer played the role of a newly assigned staff officer in the headquarters of a deployed brigade. Performing duties in various staff sections, the officers produced an estimate of the situation at hand. Instruction progressed through a series of gates controlling their progress. Each gate required the officer to display mastery of the material before moving to the next lesson, preventing aimless wandering without corrective feedback. The students were more surprised to find notes from their instructor providing helpful pointers and encouragement on their progress waiting for them when they logged in. What they thought would be complete freedom of action was instead a controlled, methodical, and observed system of instruction that guided them, almost without notice, on the logic of the decision making progress and its application.

The first two weeks passed quickly, culminating in an examination requiring completion of an operations estimate. Some of the officers finished in a week, others took the entire two. Each balanced time with family and study according to his own design, but all of them started the first day of group work at a common level, ready to undergo the next part of the instructional process.

Meeting in their small group classroom after physical training, the students received additional results on their first examination. The instructor displayed alternative solutions on the screen and captured trends, illustrating various issues. Because the database and instructor interface optimized information and instructor time, their leader fully understood the strength and weaknesses of the group. In the course of a few hours, he was able to further consolidate the average entry-level knowledge. This ability was greatly facilitated by observing them the last two weeks. In many respects he already knew them; he knew which ones worked everyday on their lessons, which ones worked in spurts, the early risers and the night owls. Was this important information for his task at hand? Yes, because his task was to help them learn how to think. By observing their behavior the first two weeks he better understood the individuality of each student and could tailor instruction to assist them.

The small group classroom was modest by contemporary standards. Simple tables and chairs, not elaborate workstations, provided working space for the students. The entire room was designed for quick reconfiguration. The room contained wireless networking allowing the students to connect their laptops wherever they desired. The basic configuration was a large U shaped design, which facilitated observation of student

or instructor work on the flat screen panel on the front wall. The instructor could call up his or any student screen and present it to the rest of the group with a simple keystroke or by the use of a stylus on the front panel. Simultaneously all the students could see the material on their own laptop and could each interact with the material. All software applications worked inside a browser system, which provided a simple yet effective mechanism for sharing work.

The instructor had obviously done his homework. Inside his machine he had packaged together a series of practical exercises, animations and three-dimensional applications from the on-line lessons. He selected them due to student performance failings and called them up to quickly demonstrated proficiency on selected tasks that had caused the group problems.

One particular example got the students undivided attention. The instructor overlaid a set of student graphics for an attack by fire position on three-dimensional terrain built in virtual reality modeling language. He then brought up the situational template for the same mission and everyone in the room observed the potential problem. A large hill mass prohibited observation and direct fire between the two positions. This became painfully clear when the instructor beamed the small group into the 3D terrain to the proposed position. No templated enemy positions were visible; the position as drawn was useless for its intended purpose. Incredibly the instructor tapped the screen and the enemy position slowly revealed itself. The instructor had changed the time of year and without leaves the trees no longer prohibited observation.

The instructor was not finished with his dramatics just yet. Next he showed the students how they could use a constructive simulation to observe the results between various friendly and enemy courses of action. To illustrate the importance of time distance planning, the instructor ran a quick segment that clearly showed the enemy force occupying a key piece of terrain before the friendly force arrived. The instructor then brought up a slightly modified approach with an entirely different result. This time the enemy was interdicted and took significant losses, another lesson was ingrained in the small group.

The power of showing the small group potential cause and effect relationships from their work had immediate effect. To validate it, the instructor then issued the day's practical exercise. He divided them into two teams, assigning each officer a different staff role. He then issued the higher headquarters order and outlined the first requirement. Each team would brief mission analysis in three hours. The students quickly rearranged the room and got to work.

All of them had performed similar exercises on-line, but this was different. Each had done the analysis individually, but they now had to interact with other students. This interaction proved more difficult than previously thought.

The area of operations contained a housing development and urban sprawl similar in design to others across the country. Operating in this environment unnerved them because it reminded them of various historical disasters in similar terrain. Intent on not repeating the disasters, the students focused their energy on a true appreciation of the terrain and what it meant for their operation. The intelligence officer brought up a 360-

degree photograph of the objective area. The brigade task was to seize a terrain objective in order to create maneuver space for a follow on force. The picture assisted the intelligence officer in visualizing the obstacles, fields of fire, and avenues of approach into the objective.

Simultaneously the operations officer attempted to distill the requirements of the higher order. In this case it was a continuation of the order they had worked on individually the previous week. The order itself was a simple fragmentary order, distributed electronically. While he went over the particulars the front panel came to life.

Their instructor, playing the role of the higher commander, came on line and a short video teleconference ensued. The instructor updated information about the terrain and enemy. Of course, for the students, there is nothing worse than having to deal with new information, it always complicates matters and tends to make the process harder.

The overall objective of this exercise was to familiarize the students with the information management system and the various tools used to perform it. Increased computing power does not automatically equate to increased information or knowledge, let alone comprehension. In order to make it useful, the students needed to learn how to turn the vast amounts of data into information. This ability required them to recognize important data inside all the noise. Lacking experience at the brigade level, these students did not always know what to look for and had difficulty sifting through the vast amounts of data they were quickly assembling.

At the appointed time the instructor received the briefings and provided a critique of the exercise. His after action review emphasized situational assessment and techniques

for sorting the data. Repetitive experience gave him a distinct advantage, providing an ability to focus on the important aspects of the situation. While the students were overcome with information and unable to create viable solutions, the instructor cut to the heart of the problem and presented creative answers. He carefully guided them through the maze and by the end of the session everyone had a firmer grasp on the techniques used to manage the vast information streaming into their command post.

The next day in class the instructor provided another little surprise for the students. Up to this point, instruction occurred inside the classroom utilizing the various electronic systems to assist them in visualizing the battlefield but today would be different. Their instructor told them to pack up their computers. They were headed to a vantage point to overlook the terrain. Orders would be updated and issued in the field.

These next steps completed the lyceum's cycle, balancing student appreciation of each perspective, a flat map and pictures, a virtual model and live. It was this last step that provided a complete understanding of the physical environment and the limitations of digital systems in replicating it. Understanding the capabilities and limitations of the various systems was an important part in the technical competence required of these leaders. The lyceum would be unable to provide this to its students if it had selected another terrain model for the tactical scenarios. At the completion of the day's exercise the students would better understand the capabilities of their systems and these capabilities would be reinforced many more times before they left Fort Agawam.

The students spent a number of weeks replicating this pattern of instruction at the brigade and battalion level. They received repeated opportunities in performing the

decision-making process as a staff member and learning how to manage information inside the various command posts. Each day they faced some form of constructive simulation illustrating cause and effect relationships between their planning decisions and battlefield events. Now armed with a better understanding of the process and procedures they were ready to start the next phase of the instruction at the company level and the new challenges it would bring. We join them now on their first day of company team operations.

After the instructor finished the discussion on tactical movement, he assigned the day's practical exercise. Today the students would perform the duties of company team commander in the adaptive leadership simulation. Since the class was studying tactical movement, they would train the task again, only they would now execute the task in an environment that would force them to come up with unique solutions to the various events that confronted them.

The lyceum had developed the simulation to fill the gap between classroom instruction and virtual simulation. Traditionally, constructive simulation was used but this form lacked the human interactions significant in leading company teams. This simulation allowed each student to perform the duties of commander while interacting with computer controlled subordinates and superiors. Each decision by the student was captured by the computer and used later to provide feedback. Since these decisions influenced future events and the capabilities of the unit to deal with them, the simulation provided an intermediate step before trying out ideas and techniques on human subordinates. Thus this deliberate practice trained necessary skills in a progressive

fashion bridging the gap between classroom and field environment. Because every student could play simultaneously and required none of the overhead of traditional virtual simulation, every student underwent multiple iterations of the scenario in the same amount of time previously used to train but a few.

The adaptive leadership simulation employed an interesting hybrid feedback system. Since the instructor was unable to simultaneously observe all fourteen students, assistance from the simulation was necessary. Key data points such as the student's priority of work, resupply and maintenance decisions, as well as his tactical ones, all went into the central database. This database served a dual purpose. The first linked to the instructor who called up student records offering helpful pointers and further exercises tailoring the experience to the individual students need. The second purpose of the database was to provide a storehouse of alternative solutions available for student review after they completed an exercise.

An additional advantage to the leadership simulation was its ability to provide a learner-centered environment. Each student progressed through the simulation individually, with ever increasing levels of intensity or difficulty. Simple alteration of the forms of contact, and the types and numbers weapons available provided endless variations. For example, a student's first iteration of the support by fire scenario would only include visual and direct contact with the enemy. Later iterations could include indirect fire, electronic warfare and air attacks. Manipulation of these scaleable conditions provided a stepwise approach within the simulation. This stepwise approach closely

mirrored the classroom experiences of each small group ensuring connectivity between classroom and simulation.

Another type of exercise used in the classroom exercised the student's creative thinking and ability to anticipate requirements. At the start of the day the instructor frequently brought up a quick decision exercise. Normally each student received a situation on their screen, inputted their course of action and sat back to watch the action. On some days the class was split, half the class solving opposite sides of the problem. The instructor would bring up two competing solutions and run the courses of action. As they ran, he would stop the action to allow the students to discuss what was occurring and provide rationale for their actions. The students would then update their orders and the process would continue. The instructor could usually get through six to eight solutions in an hour depending on the amount of time devoted to discussion.

Another variation pitted the students against a computer model controlled by the instructor. This variation allowed the instructor to carefully select events to ensure certain discussion topics came up in the action. Normally this type of exercise was used to introduce a new topic to the class. This shared experience tended to create and then focus the group on the desired learning objective. Because the experience was common to everyone in the room, the instructor could readily foster discussion and exploration of various solutions focused on analysis of the observed cause and effect relationships. This format also lent itself to presenting alternative solutions as well as repetitive experience.

The students worked through two weeks of classroom exercises interspersed with terrain walks to fully ground themselves in offensive company team operations. At the

conclusion of these two weeks they moved to the virtual simulation facility to increase the battlefield frictions confronting them.

The small group fell in on the supporting training unit that supplied the necessary manpower to crew the various vehicles. Each officer performed the duties of a vehicle commander rotating through the duties of platoon leaders and company commander. The small group spent a week in virtual simulation, which provided sufficient iterations for each officer to experience both command and platoon leadership. Moreover the crewmembers were the same soldiers who would man the actual vehicles in the next phase of instruction.

The lyceum firmly believed that live simulation was necessary to introduce the physical stressors of combat. This short one-week exercise completed the offensive instruction phase in which the officers had progressed in a methodical crawl, walk, run system. The next week the process started all over again in a defensive environment complete with similar repetitive experience and execution focus.

After a total of twenty weeks of instruction the students were ready to return to the operational Army. At graduation the unit commander asked the students to reflect on his (the commander's) welcoming remarks. He told them they had met the challenge of the lyceum and had indeed exercised the weakest muscle in their body. He asked that they remember the intensity, frequency, and duration of the lyceum's curriculum and apply themselves in their next assignments with the same energy they displayed here.

We now leave our brief look inside the Lyceum at Fort Agawam in the year 2005. While Captain Swift would be completely lost immersed in the technological

advancements made since 1897, he would be comforted by the continued use of practical application and the focus on equipping each officer with the tools necessary to adapt to battlefield circumstances.

CHAPTER 6

CONCLUSION AND RECOMMENDATIONS

Theoretical instruction is analytical; practical instruction should be synthetical. We must begin at the bottom, and build up a simple, solid structure which shall survive the vicissitudes of a long and varied career. (Pettit 1897, 45)

Captain James S. Pettit, "Proper Military Instruction"

Conclusions

The current instructional model in the Captains Career Course lacks the structure and methodology to provide officers capable of leading the Army After Next. Some experts think that information technology will change the rules and overshadow the role of the leader in AAN. This statement from General DePuy is as appropriate today as it was when he said it.

Given any set of weapons at any particular time, the battle will be more affected by the difference in leadership and troop performance between the two armies than it will be by the difference between weapons. The difference between the M60 tank and the XM1 tank, although important, is less important than the difference between high performance units and low performance units. (Brownlee and Mullen III 1987, 193)

Replace weapon systems with information systems and a similar situation exists today.

Barry Watts in *Clauswitzian Friction and Future War* provides further evidence of the primacy of the leader on the future battlefield. His update to the three sources of general friction provides a twenty-first century replacement to the historic Clauswitzian sources.

1. Constraints imposed by human physical and cognitive limits.
2. Informational uncertainties and unforeseeable differences stemming, ultimately, from dispersion of information.
3. The structural nonlinearity of combat processes (Watts, 1996, 120).

These sources reveal that regardless of the quality and quantity of information systems, the future battlefield will still contain uncertainty and friction. The ability to adapt behavior under fire remains the central issue in training leadership at the company grade level. "The emphasis [should be] on being poised to act rather than being paralyzed until all the evaluations have been completed" (Klein 1999, 30).

S. L. A. Marshal's quote starting this paper illustrates the dilemma between automatic response and thinking through the situation that has confronted institutional instruction for over two hundred years. General George C. Marshal's 1903 description of instructional techniques using a map exercise and analysis of the current Career Course reveals we have not changed our instructional techniques for almost 100 years. "Routine destroys originality; it begets apathy and is outraged by innovations. It is inimical to the qualities we are most anxious to preserve" (Pettit 1897, 43). Army methods of institutional instruction are routine and lack originality. It is time those methods adapt in order to become more suitable to the new environment.

Recommendations

If the Army is planning on harnessing the power of the microprocessor then emphasis should be placed on being able to exploit various databases, manuals, training exercises, etc. regardless of the physical location of the officer student. To facilitate this, the Army should seriously consider providing a laptop computer to every officer the day they enter active duty and upgrading it at each stop of the continuing educational system. Advances in fiber optic connectivity allow a free exchange of information; therefore, the

institutional infrastructure could focus on connectivity as opposed to building fixed sites equipped with computers. Future study could determine the cost savings in elaborate classrooms and the required costs of equipping the force with laptops. If the laptop computer is the device of choice in the operational Army then it stands to reason it should be embedded in the institutional training base as well.

Additional study is needed to determine the effectiveness of many of the changes incorporated in the model outlined in chapter 5. One significant area warranting study is the absence of execution focus in our Captain Career Course Phase I curriculum. Reduced training time in operational units demands that officers return to the operational Army equipped at the synthesis level and ready to evaluate training in their units. The framework used in chapter 5 could be used as a baseline to adapt the Captains Career Course to balance the dual requirements of training and education.

Captain professional military education is not synchronized with the fielding of information systems in our Army. The Army is wisely waiting until objective systems are fielded. However, in the interim, a gap in the training base's ability to instruct required skill sets shifts the burden to the operational Army. This gap is exacerbated by policies concerning personnel movement and stationing. Our personnel policies are remnants of our previous forward-deployed Army and they no longer assist us in maintaining a trained and ready force. A future study should look at institutional instruction and its relationship to officer stationing and career progression.

Institutional instruction remains a critical pillar in the Army's leader development model. Providing a common leadership foundation for all officers is the unique

contribution that only institutional instruction performs. This foundation is reinforced at each level of the continuing education process. The Army must provide a balanced foundation, firmly rooted between the two extremes of instruction. No officer will be equipped to adapt to new environments unless he displays both technical competency achieved through training and intellectual capacity resulting from a rigorous education. The Army has provided leaders thus equipped for over two hundred years; it can adapt and continue to do so for the next two hundred.

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